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Barr

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(54) **RETAINING COLLAPSIBLE TOTES**

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A47F 9/04 (2006.01)

(52) **U.S. Cl.**
CPC ***B65B 67/1227*** (2013.01); *A47F 9/042* (2013.01)

(58) **Field of Classification Search**
CPC B65B 67/1227; B65B 67/1233; B65B 67/1211; A47F 9/04; A47F 9/042; A47F 2009/041; B65F 1/1415
USPC 248/95, 97–101
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,031,147	A *	2/1936	Doolin	A47F 13/085	211/85.15
3,188,031	A *	6/1965	Fournier	B60N 3/08	248/95
3,434,686	A *	3/1969	Yoshizaburo	G09F 1/10	248/316.3
4,062,604	A *	12/1977	Popper	B65B 67/1216	312/211
5,503,355	A *	4/1996	Tan	B65B 67/1211	248/101
5,639,051	A *	6/1997	Surbeck	B65B 67/1216	248/100
6,325,214	B1 *	12/2001	Smithson	A47F 9/042	206/554
6,726,156	B1	4/2004	Scola		
8,668,207	B1 *	3/2014	Gilliam	G09F 23/06	280/33.992
9,310,018	B2 *	4/2016	Laitila	A47F 13/085	
10,029,815	B2 *	7/2018	Robinson	B65B 67/1266	
10,106,284	B2 *	10/2018	Bacallao	B65B 67/1233	
10,625,895	B2 *	4/2020	Bacallao	B65B 67/1233	
2009/0045314	A1 *	2/2009	Lien	G09F 1/103	248/452
2010/0314507	A1 *	12/2010	Laitila	B65B 67/1227	248/97
2013/0092804	A1 *	4/2013	Laitila	B65B 67/1233	248/97

(Continued)

OTHER PUBLICATIONS

Jokari, "Baggy Opener," [Accessed Mar. 27, 2020] https://www.jokari.com/products/baggy-opener.

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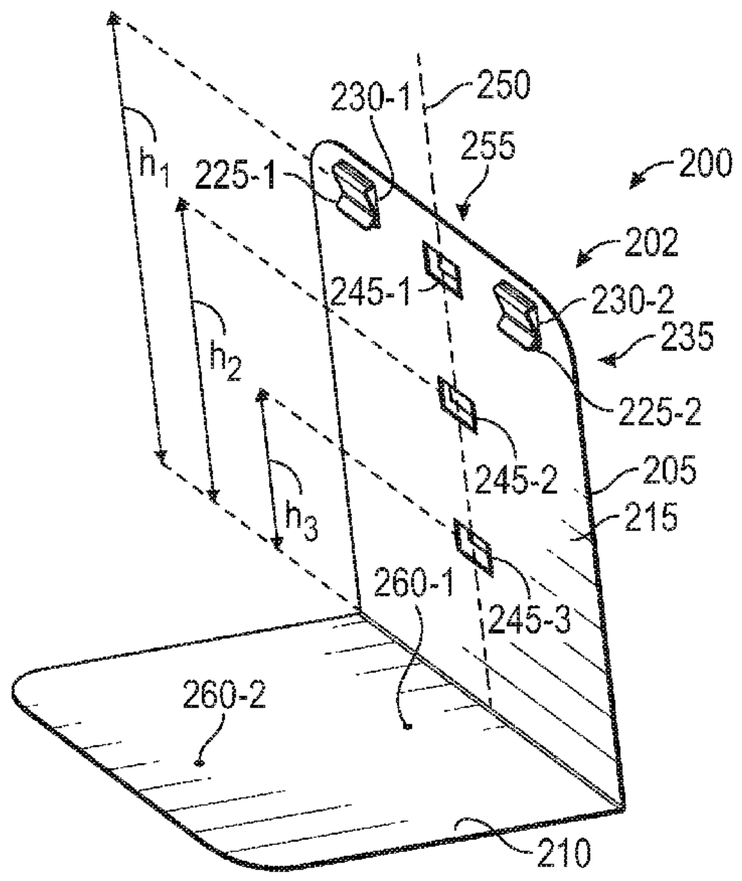
(74) *Attorney, Agent, or Firm* — Patterson + Sheridan, LLP

(57) **ABSTRACT**

Aspects described herein include an apparatus for retaining a collapsible tote. The apparatus includes a wall member and one or more engagement members projecting from one or more surfaces of the wall member. The one or more engagement members are arranged and dimensioned to removably engage respective portions of the collapsible tote, suspending the collapsible tote beside a first surface of the one or more surfaces. The wall member is inclined such that, when the collapsible tote is suspended beside the first surface, the collapsible tote is gravitationally urged toward an uncollapsed configuration.

20 Claims, 14 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2014/0138499 A1* 5/2014 Laitila B65B 67/1227
248/97

* cited by examiner

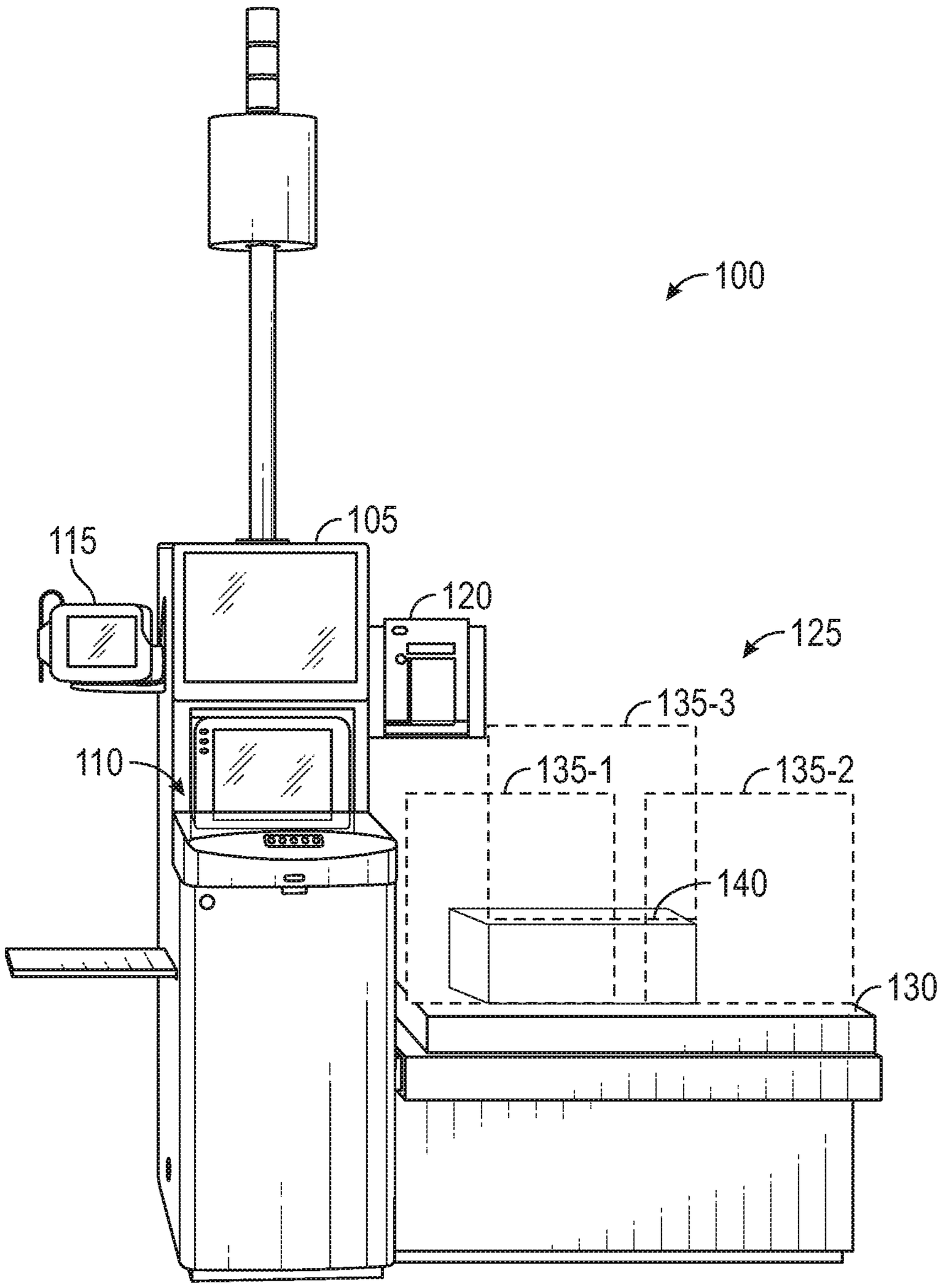


FIG. 1A

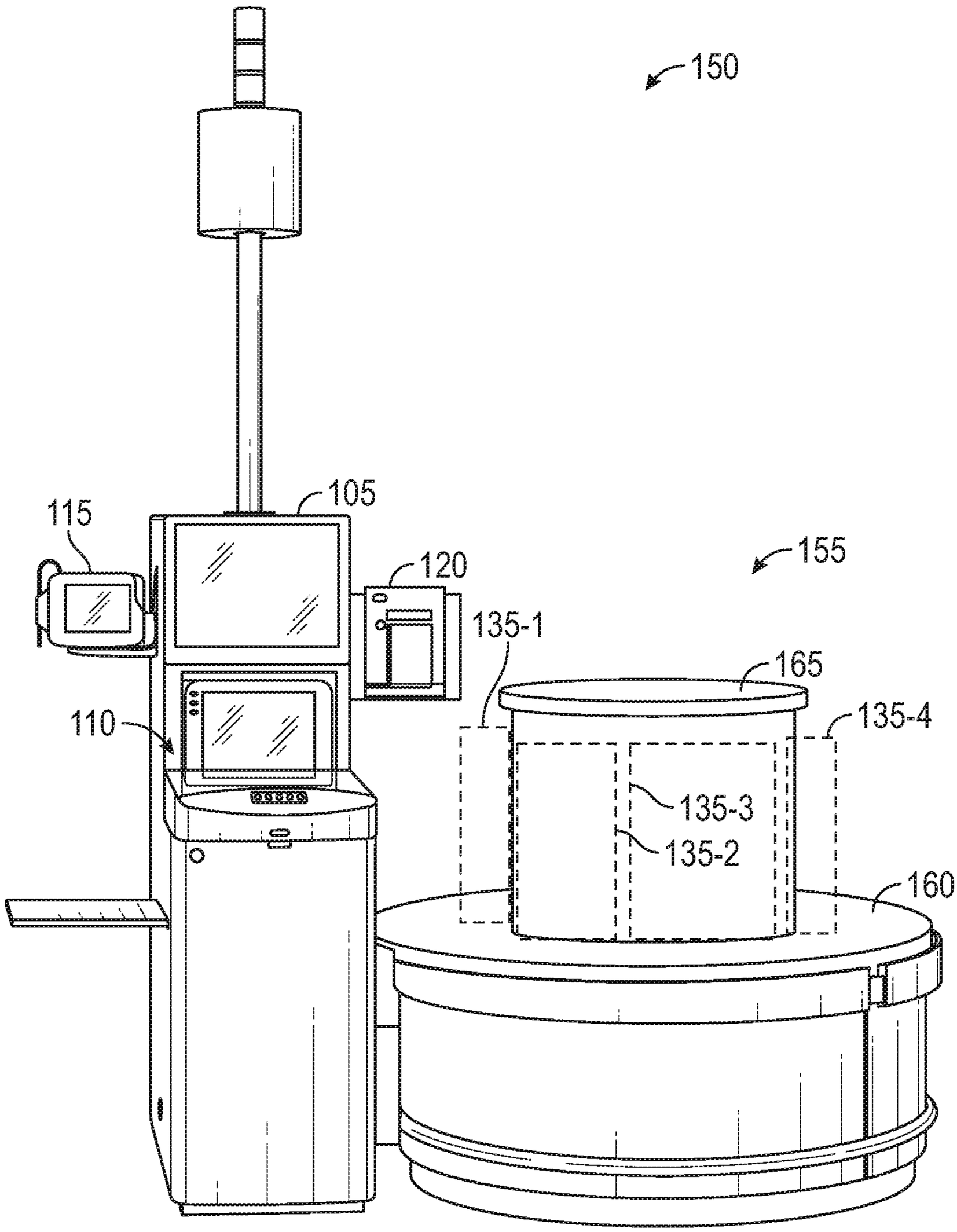
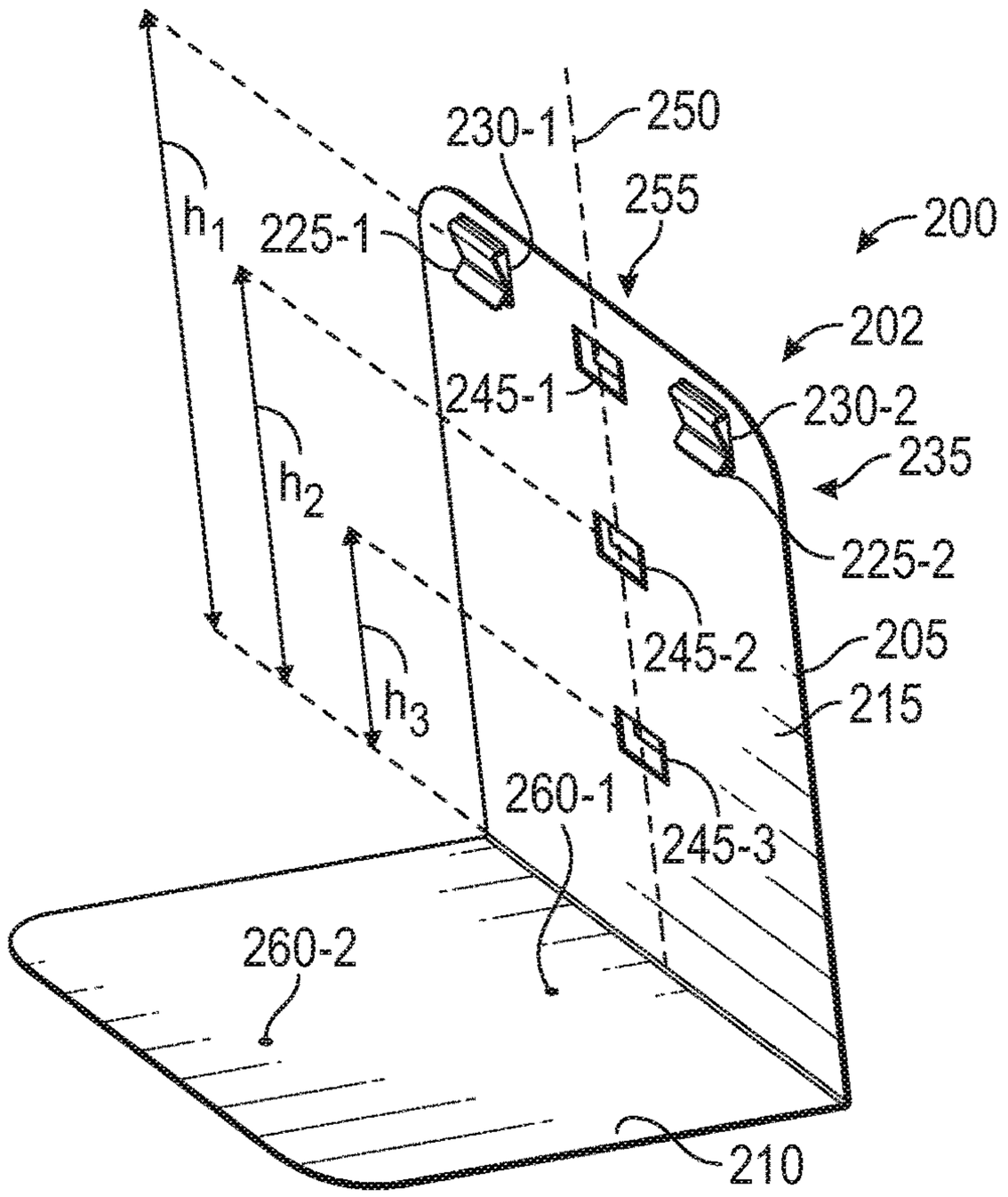


FIG. 1B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250
255
200
h_1
225-1
202
245-1
230-2
235
h_2
225-2
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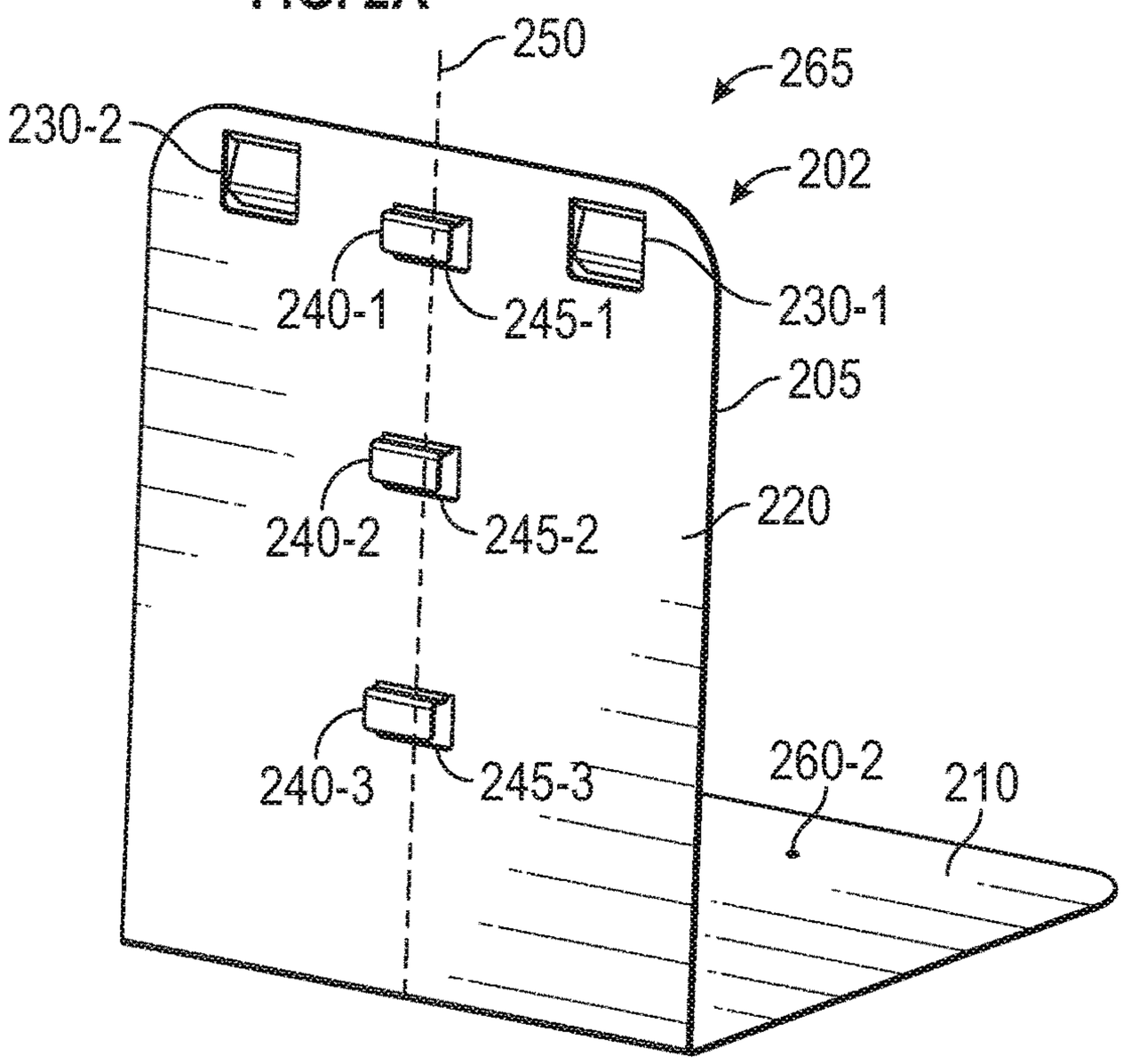
205
215
h_3
260-1
245-3
260-2
210

FIG. 2A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265
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240-3
245-3
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210

FIG. 2B

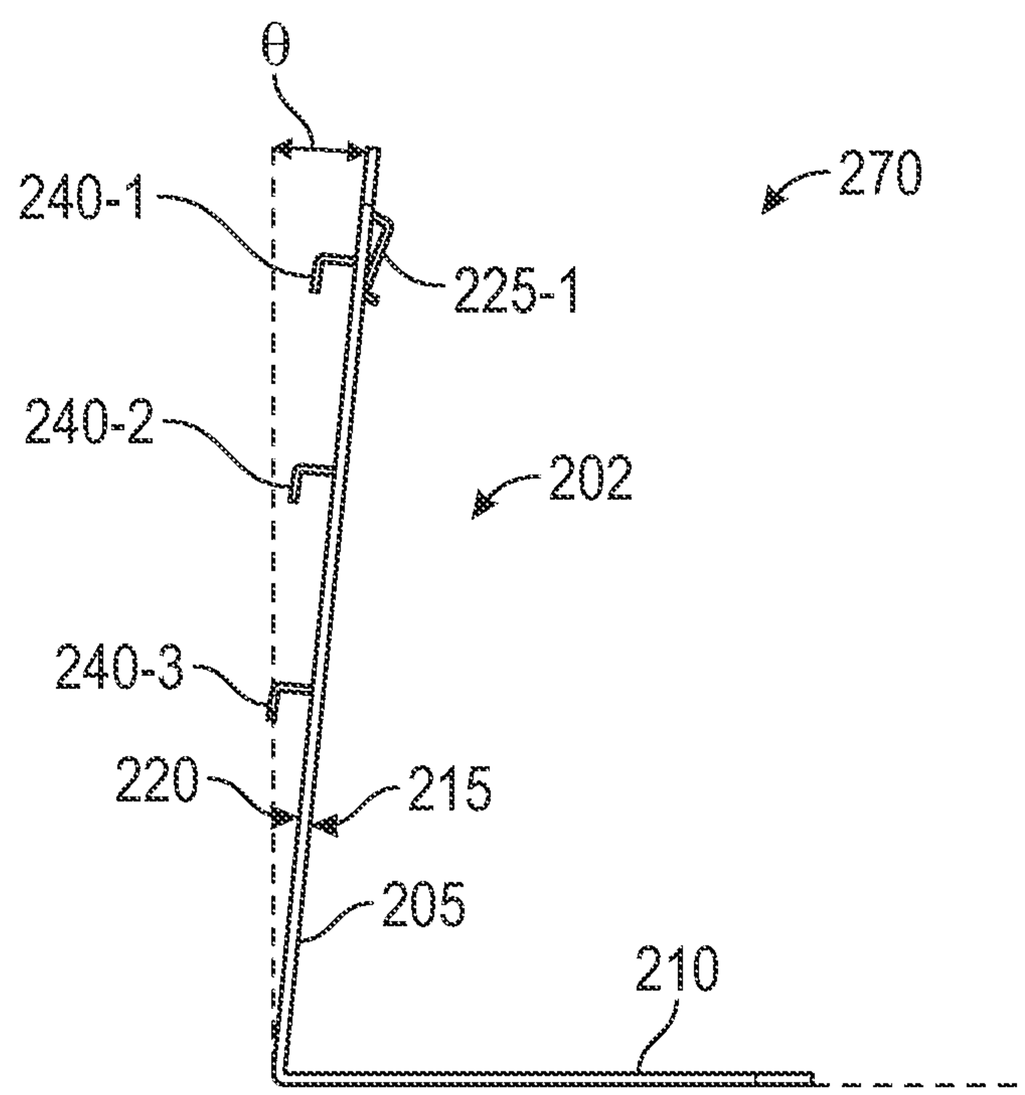
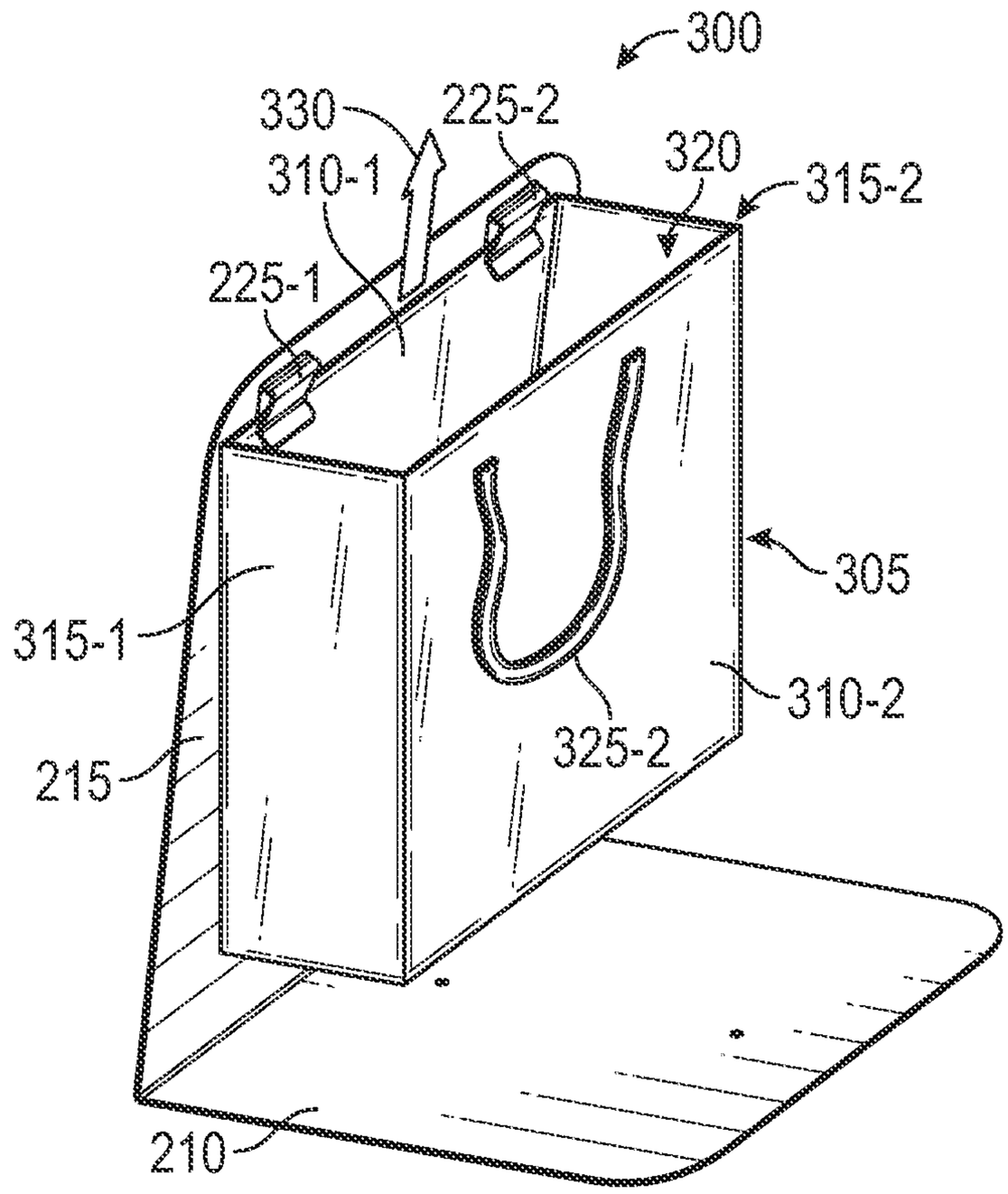


FIG. 2C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330
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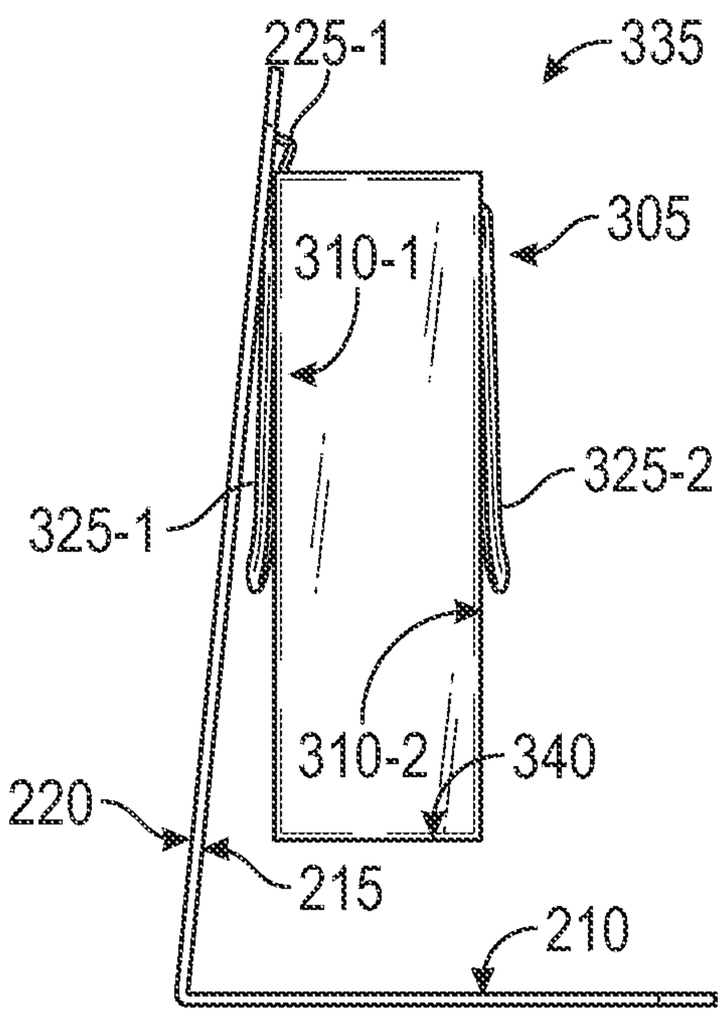
310-1
320
315-2
225-1
305
315-1
310-2
325-2
215
210

FIG. 3A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335
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310-1
325-2
325-1
310-2
340
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215
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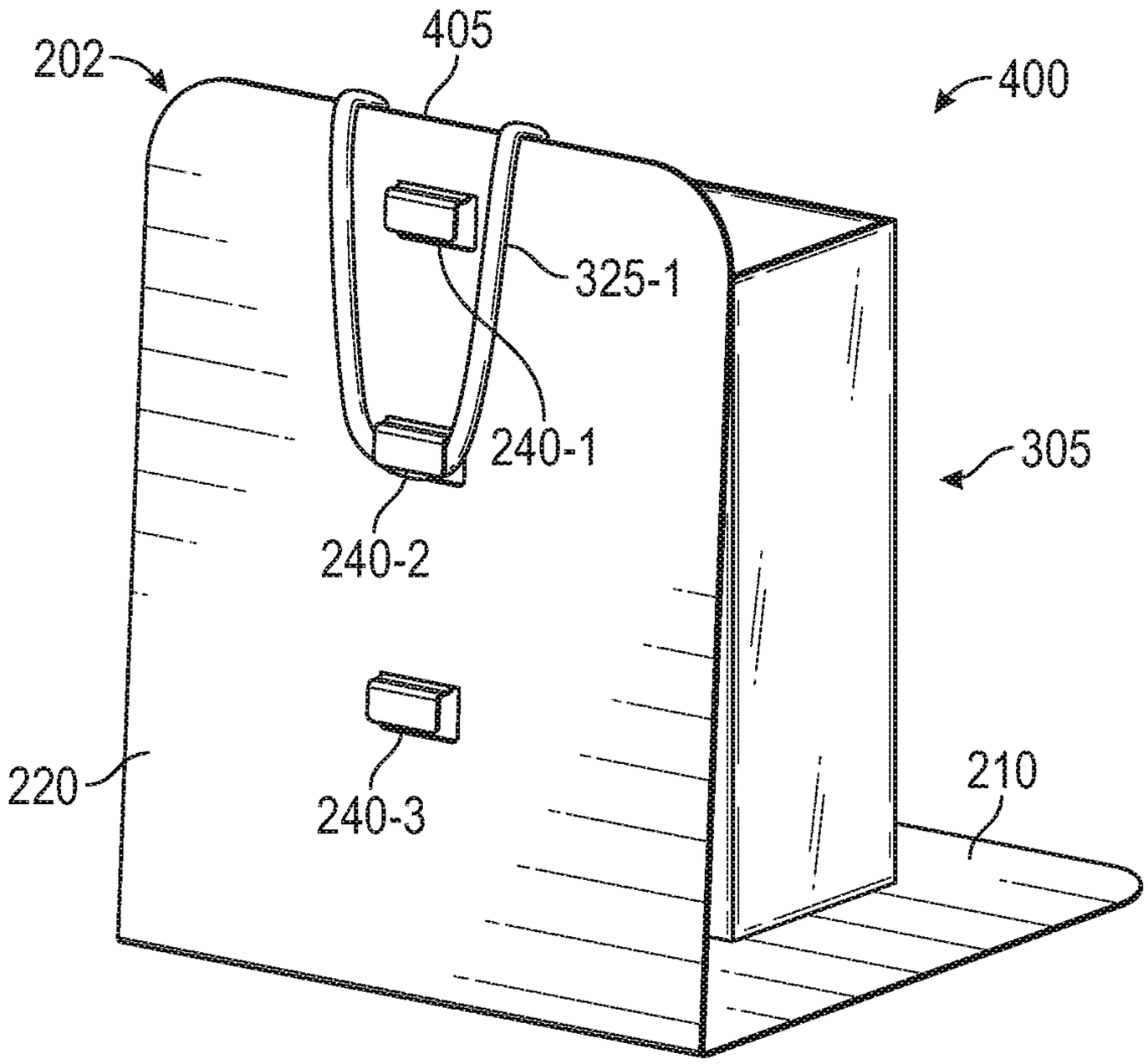
FIG. 3B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405
400
325-1
240-1
305
240-2
240-3
220
210

FIG. 4A

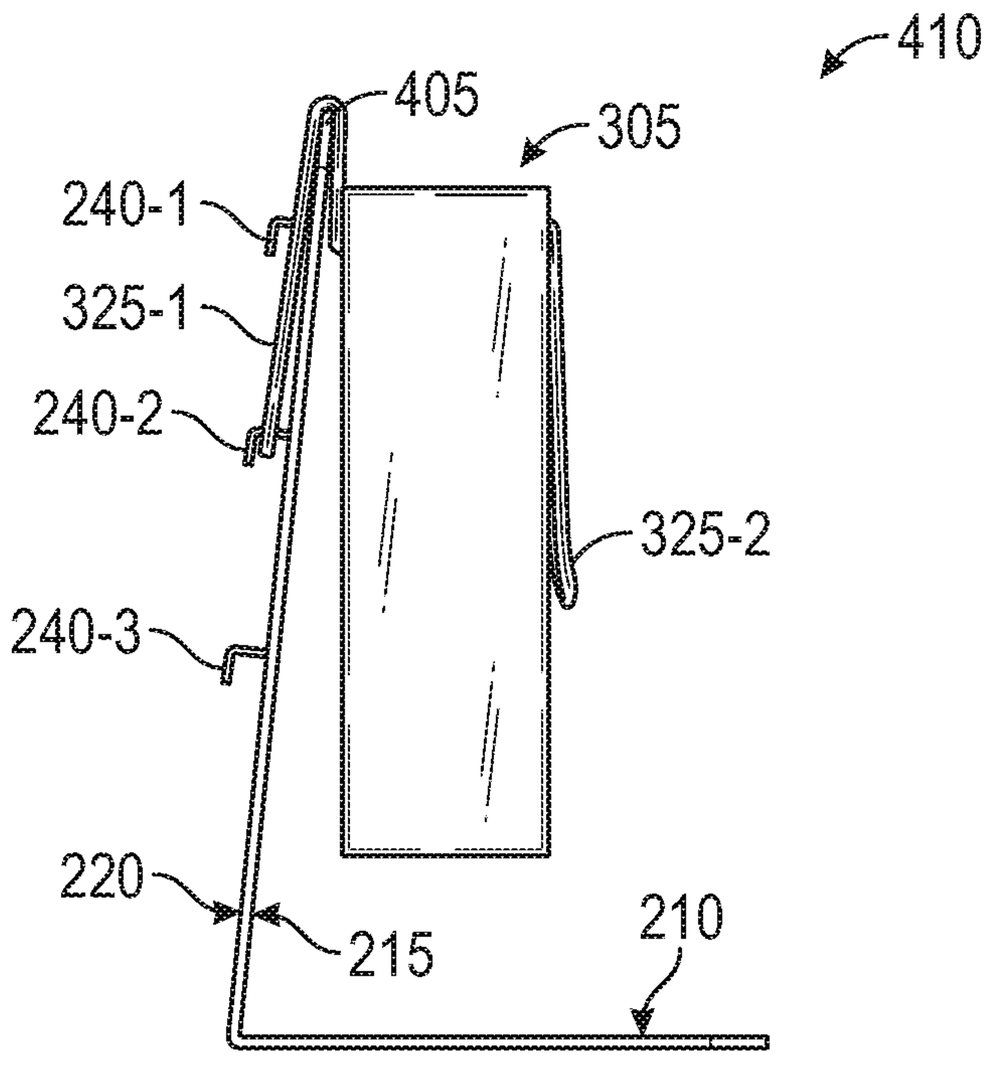

410
405
305
240-1
325-1
240-2
325-2
240-3
220
215
210

FIG. 4B

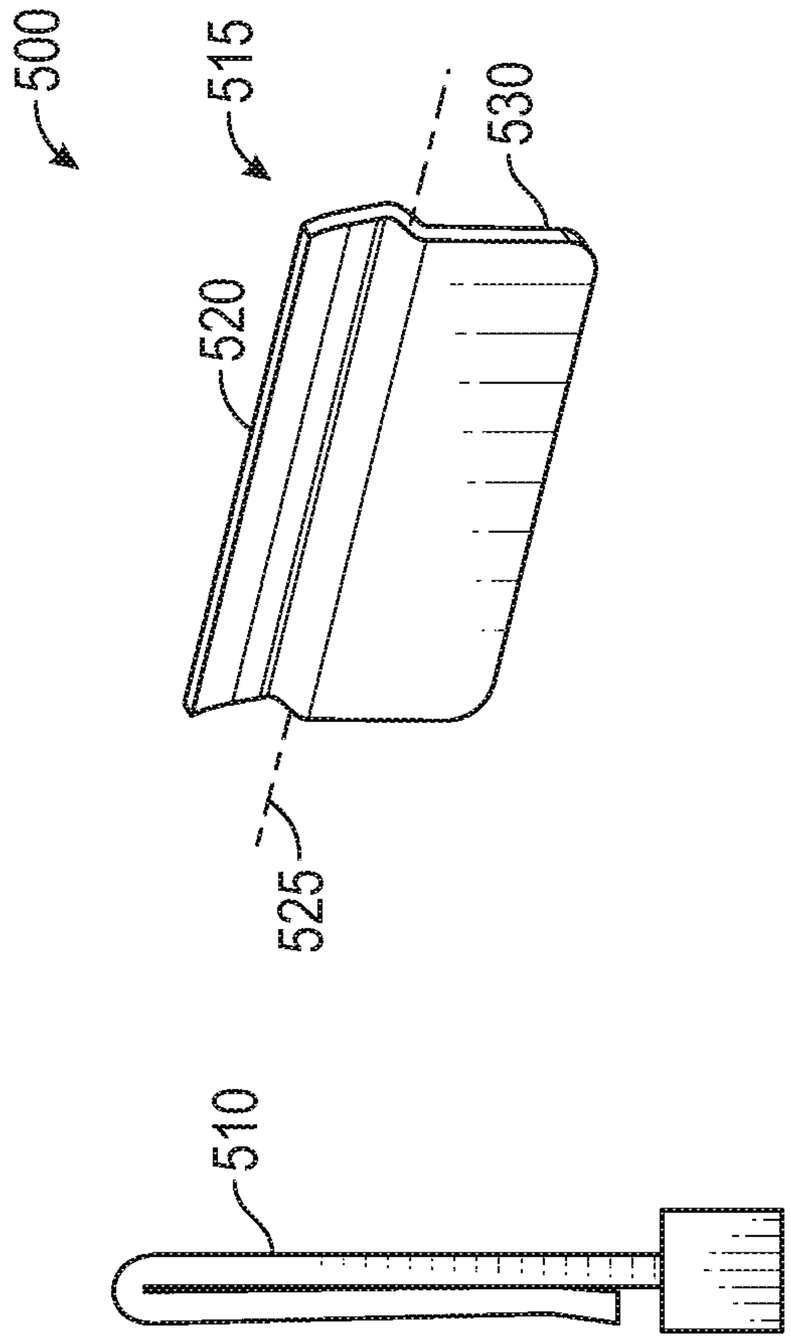


FIG. 5

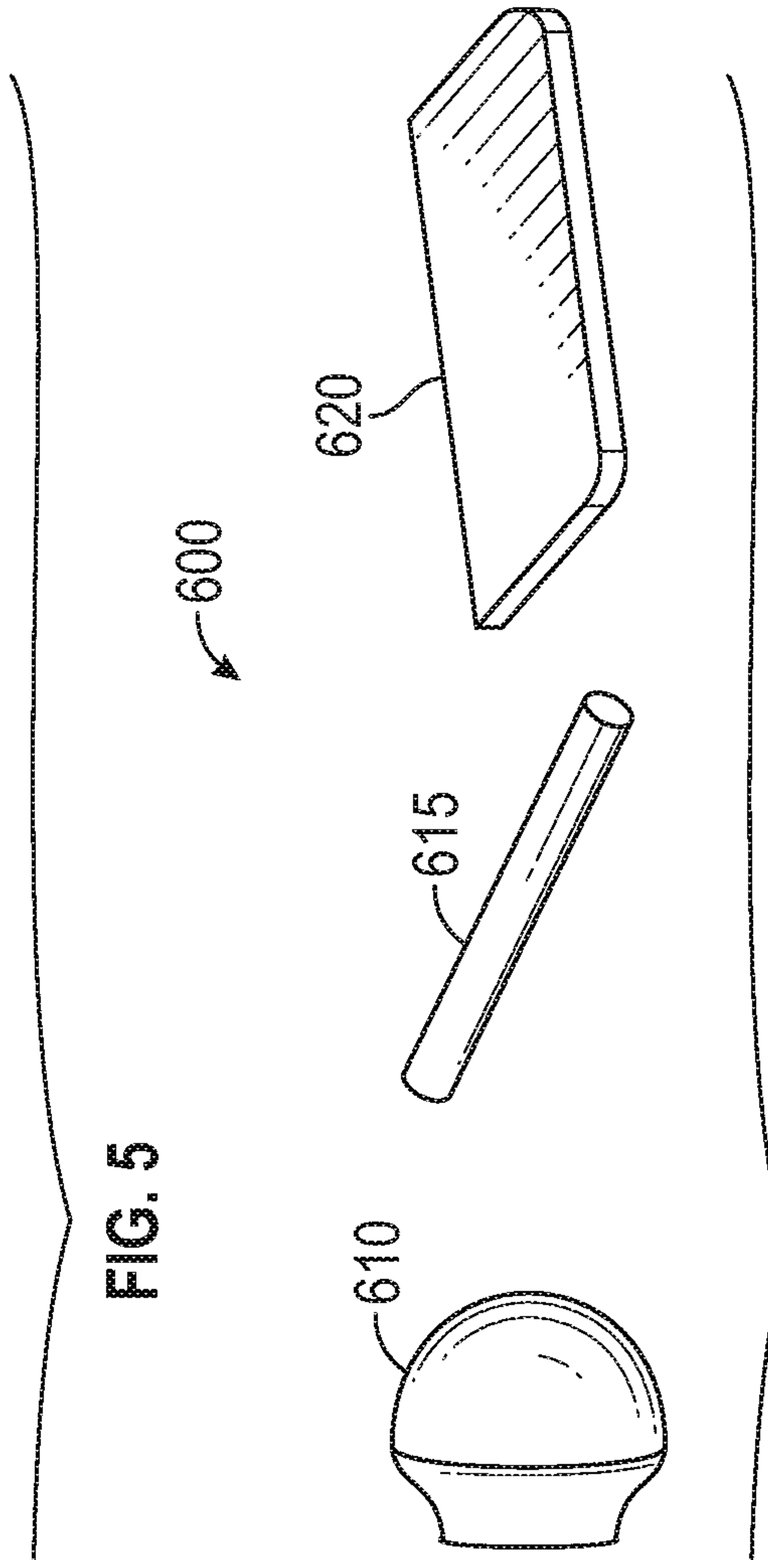
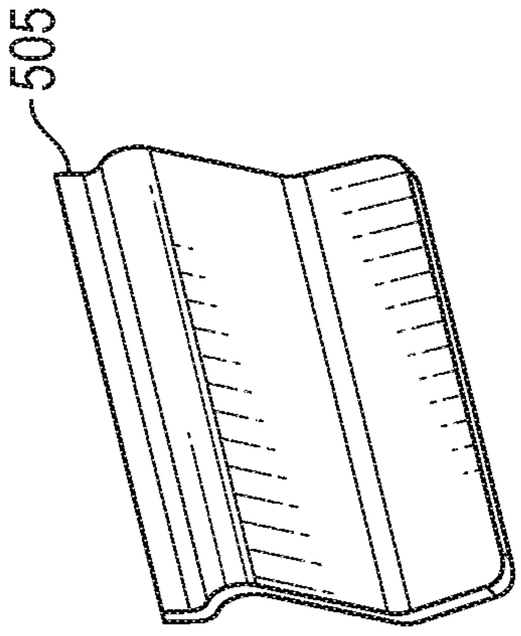
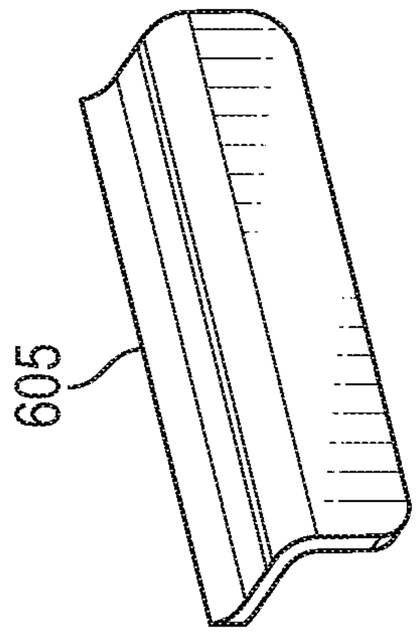
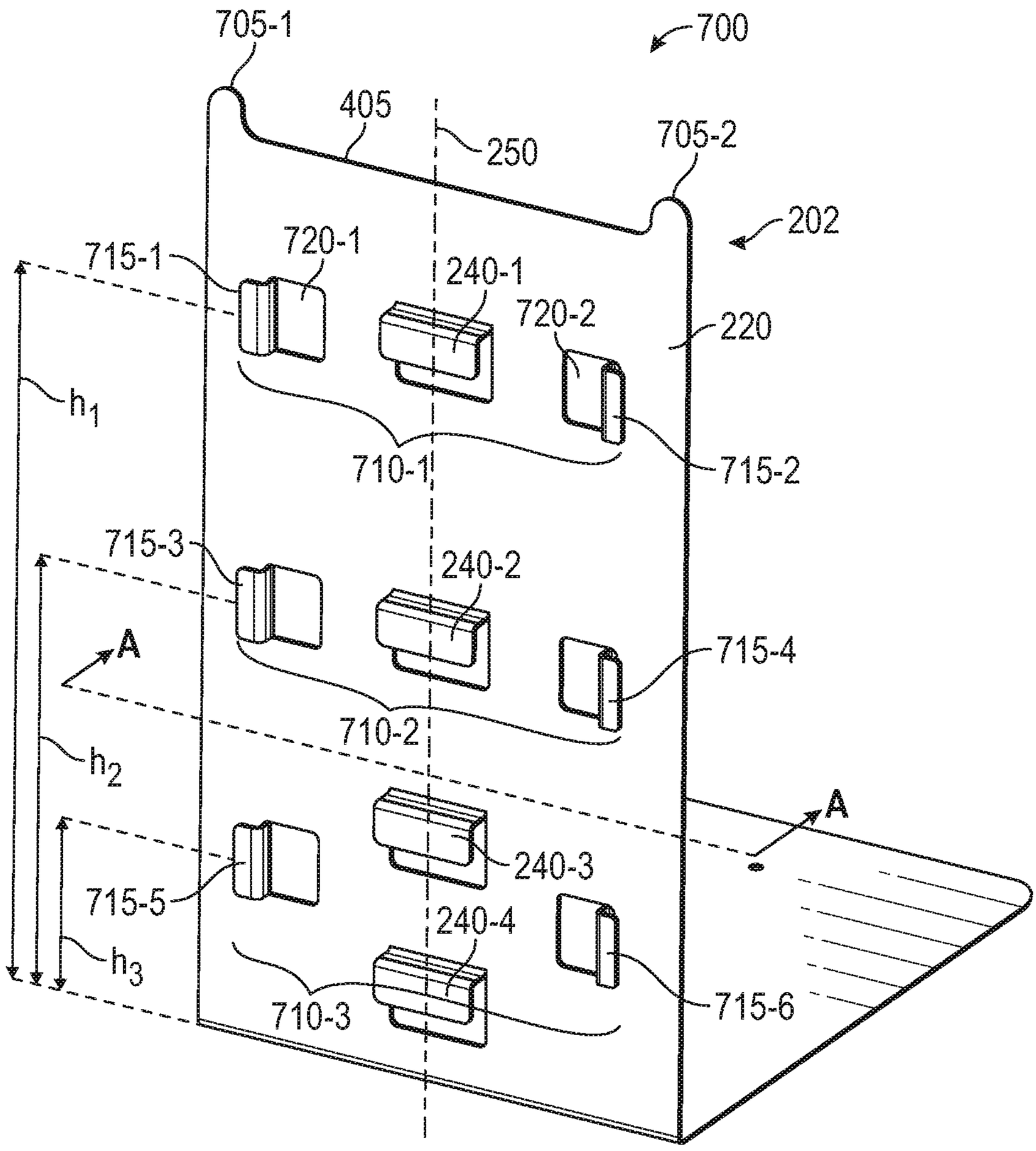


FIG. 6






705-1
700
405
250
705-2
202
720-1
715-1
240-1
720-2
220
h_1
710-1
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715-3
240-2
A
715-4
710-2
h_2
A
240-3
715-5
240-4
h_3
710-3
715-6

FIG. 7

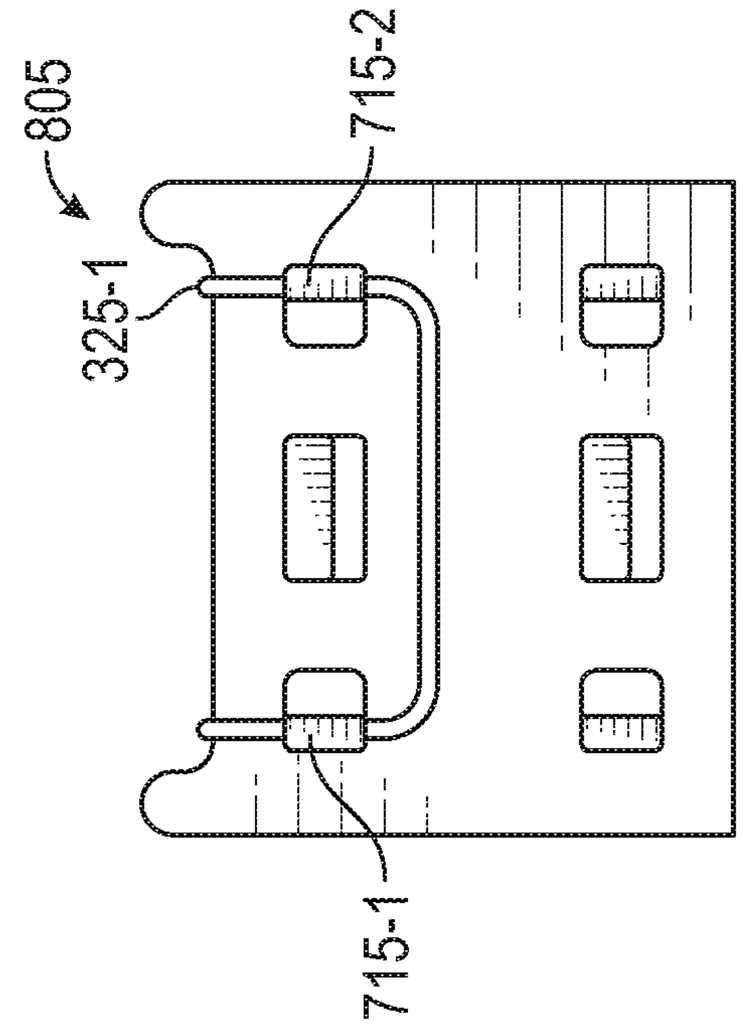


FIG. 8B

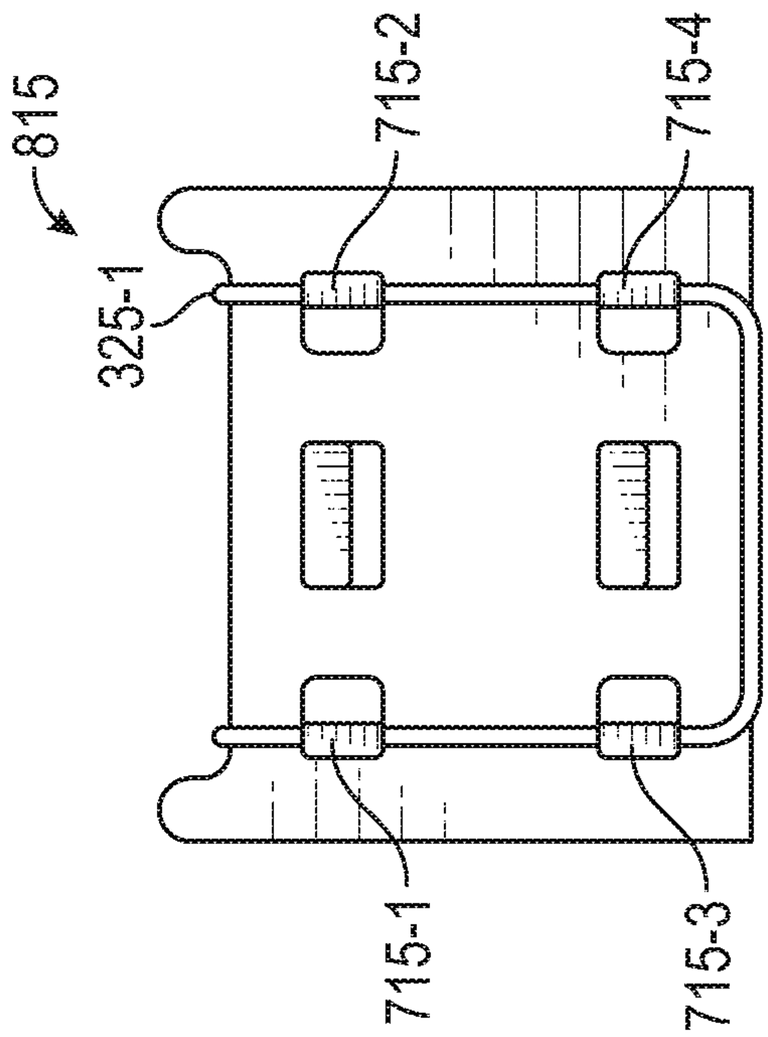


FIG. 8D

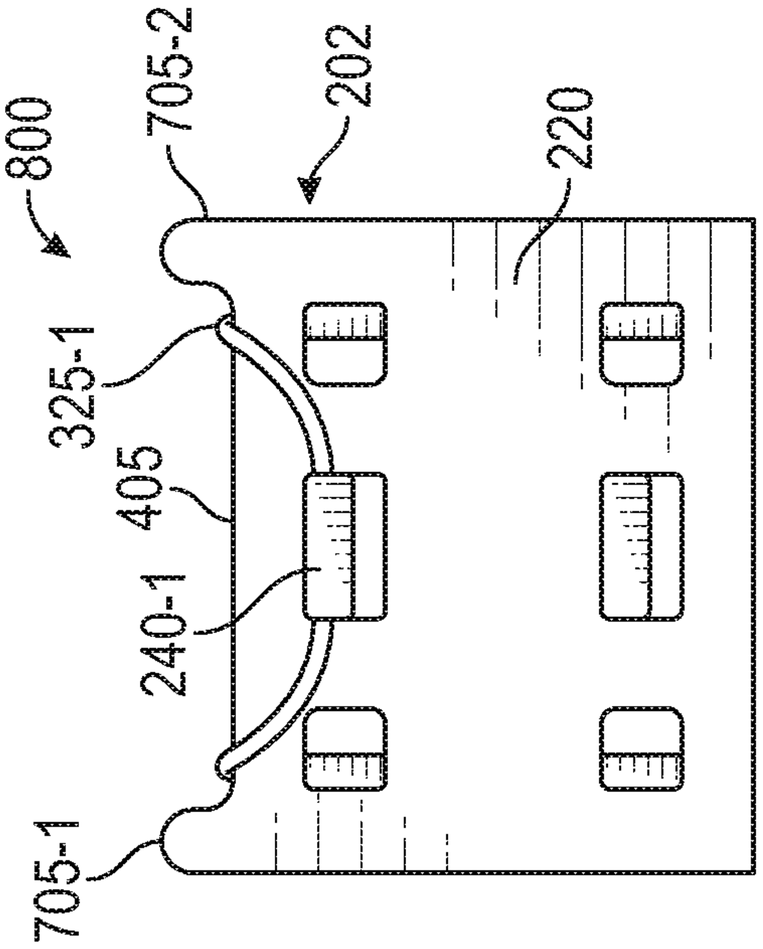


FIG. 8A

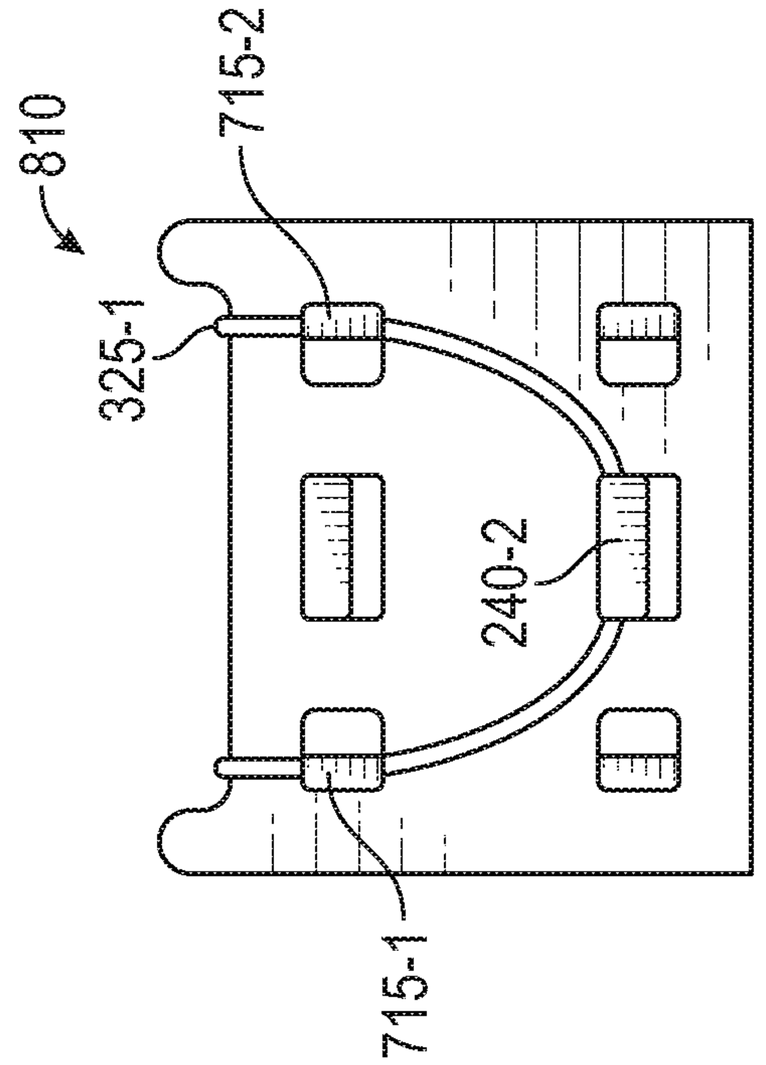
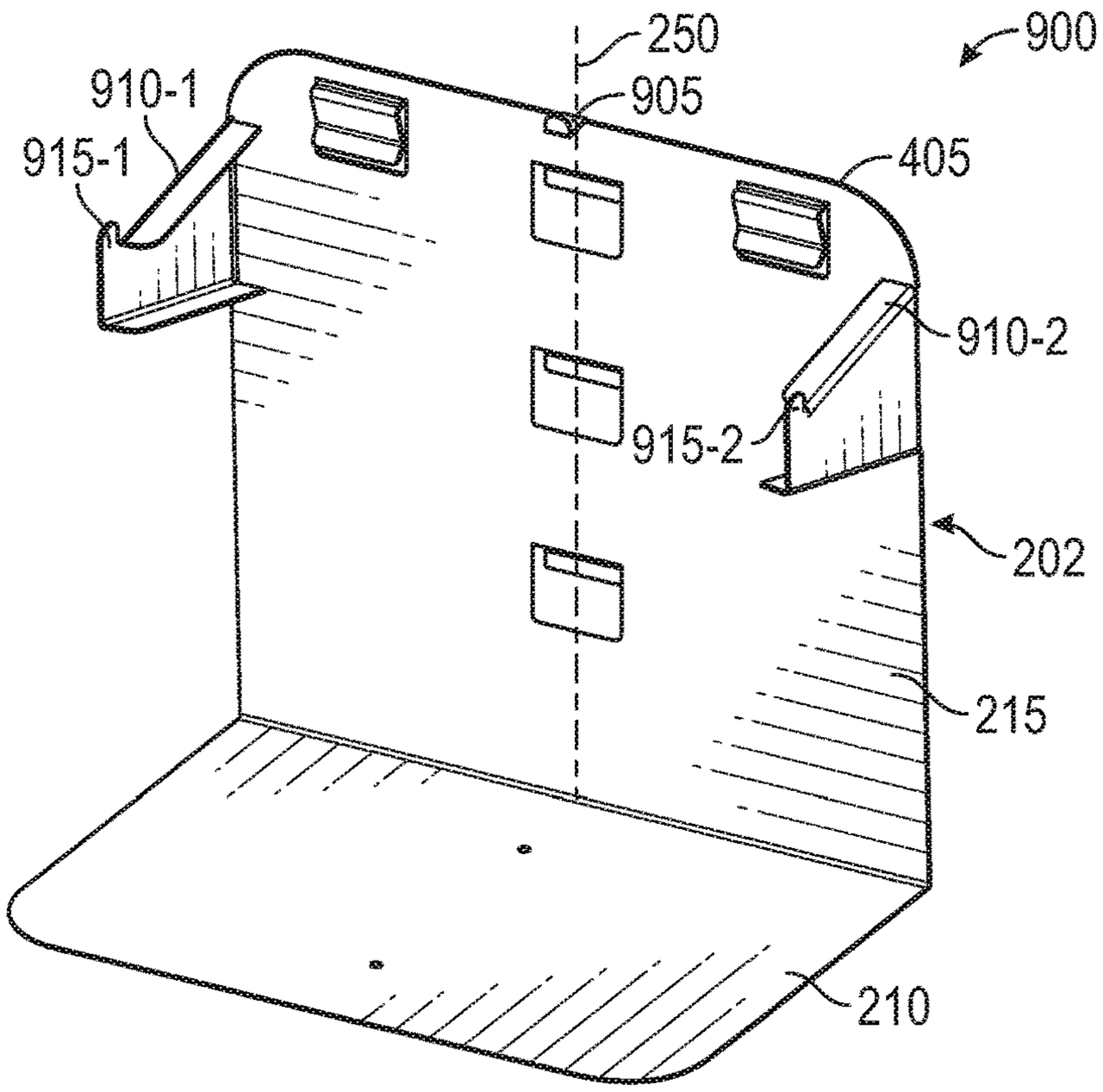


FIG. 8C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900
910-1
905
915-1
405
910-2
915-2
202
215
210

FIG. 9

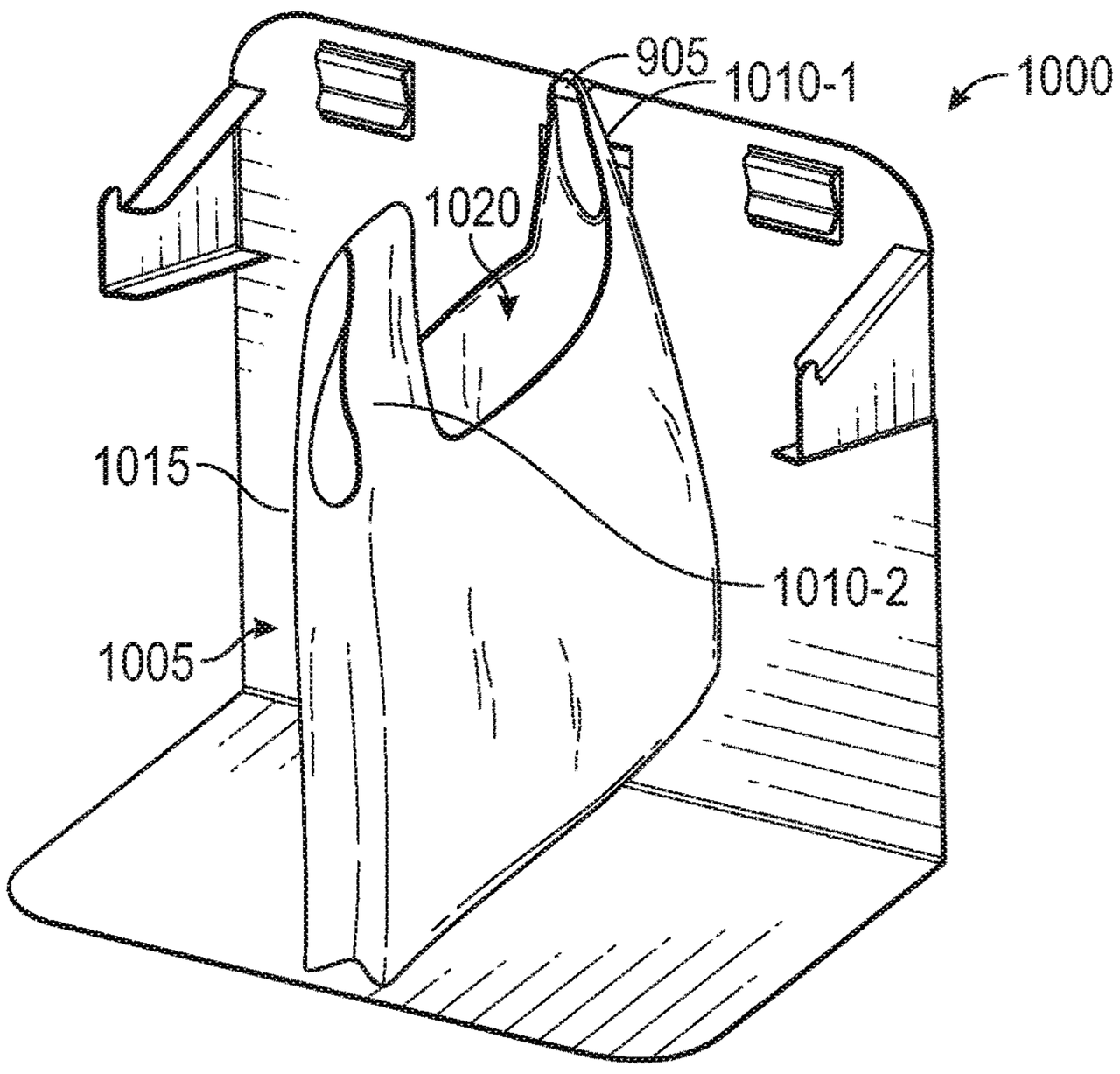

905
1010-1
1000
1020
1015
1010-2
1005

FIG. 10A

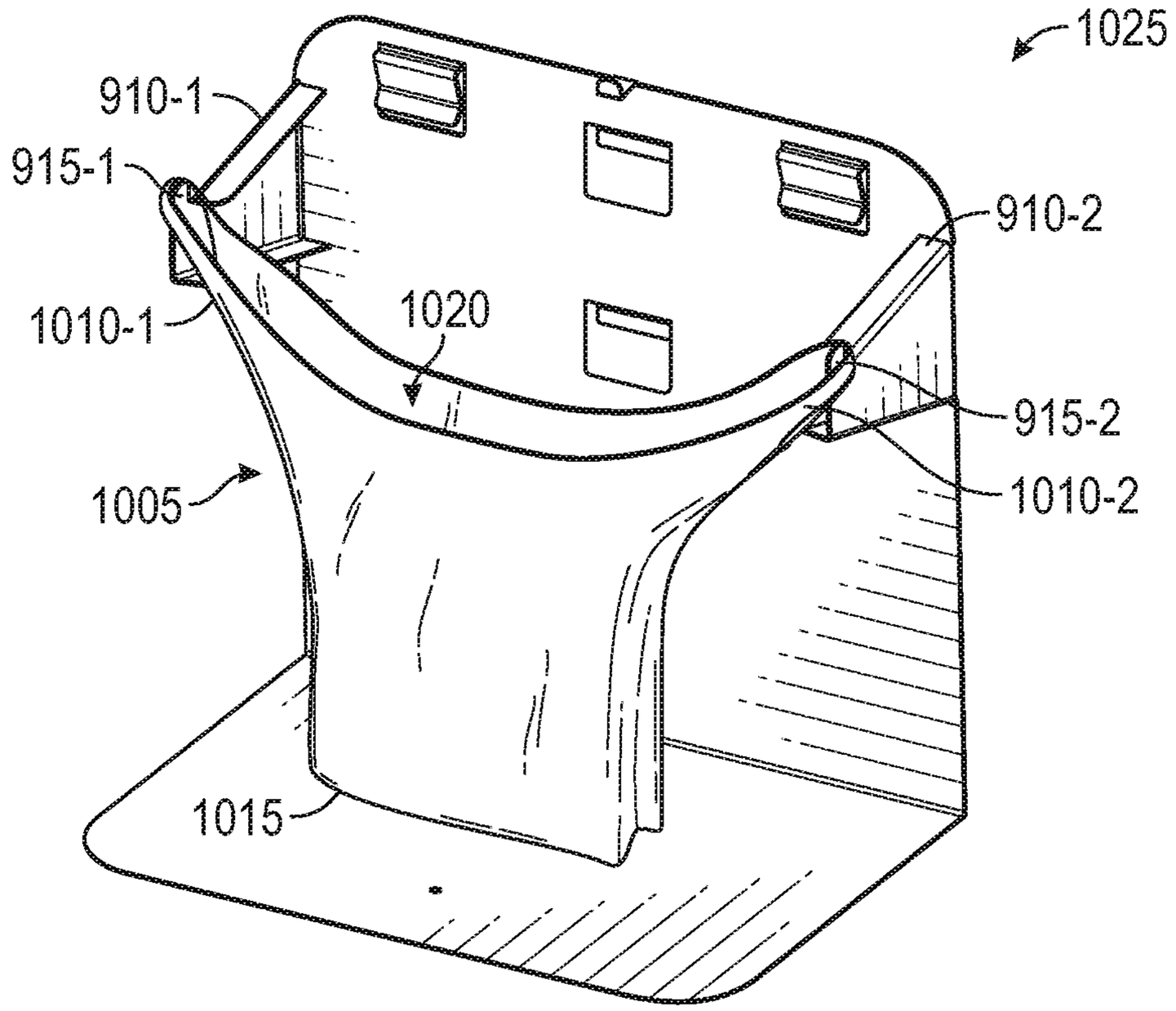


FIG. 10B

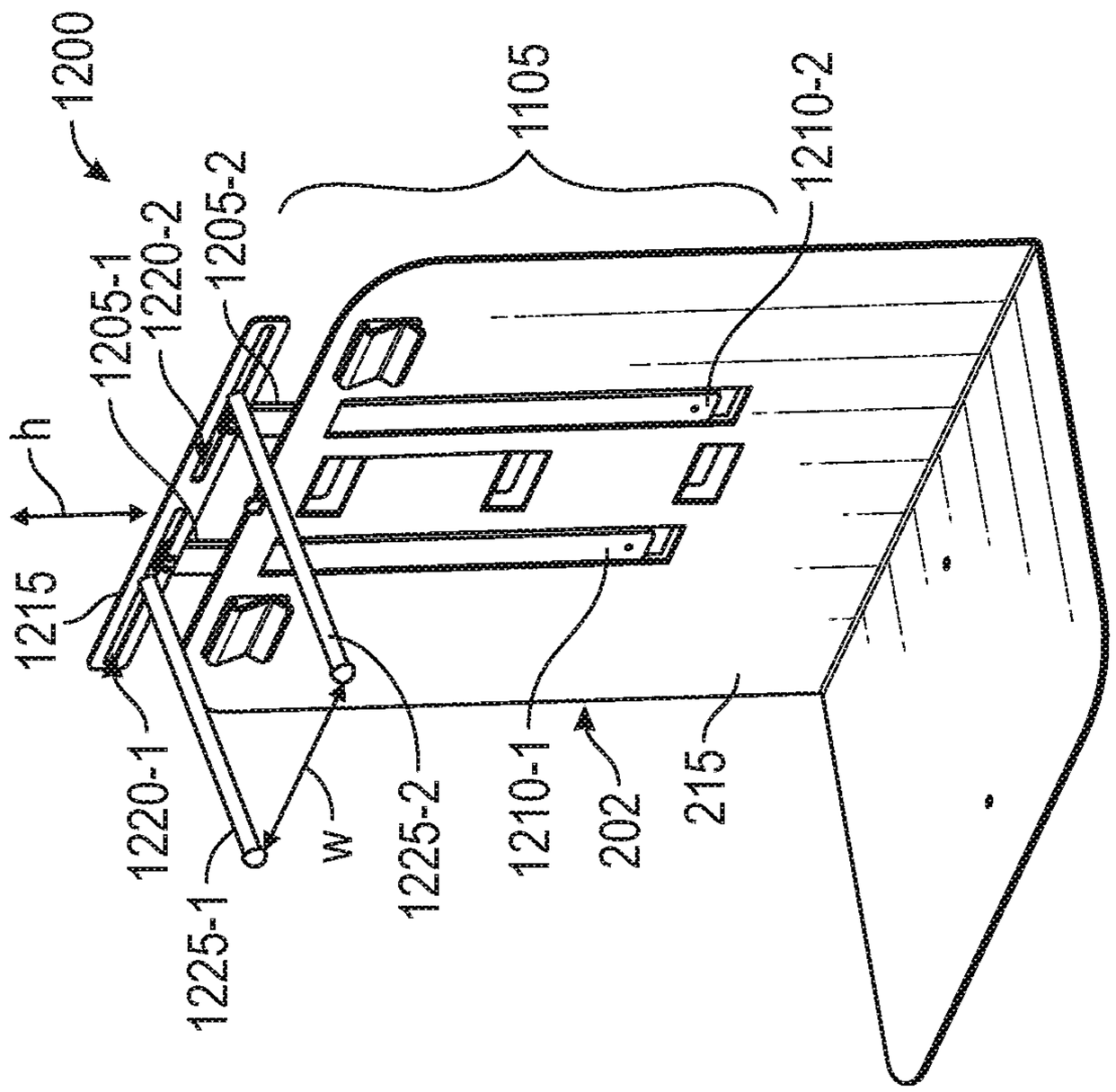

1200
1105
1210-2
1205-2
1220-2
1205-1
h
1215
1220-1
1225-1
W
1225-2
1210-1
202
215

FIG. 12

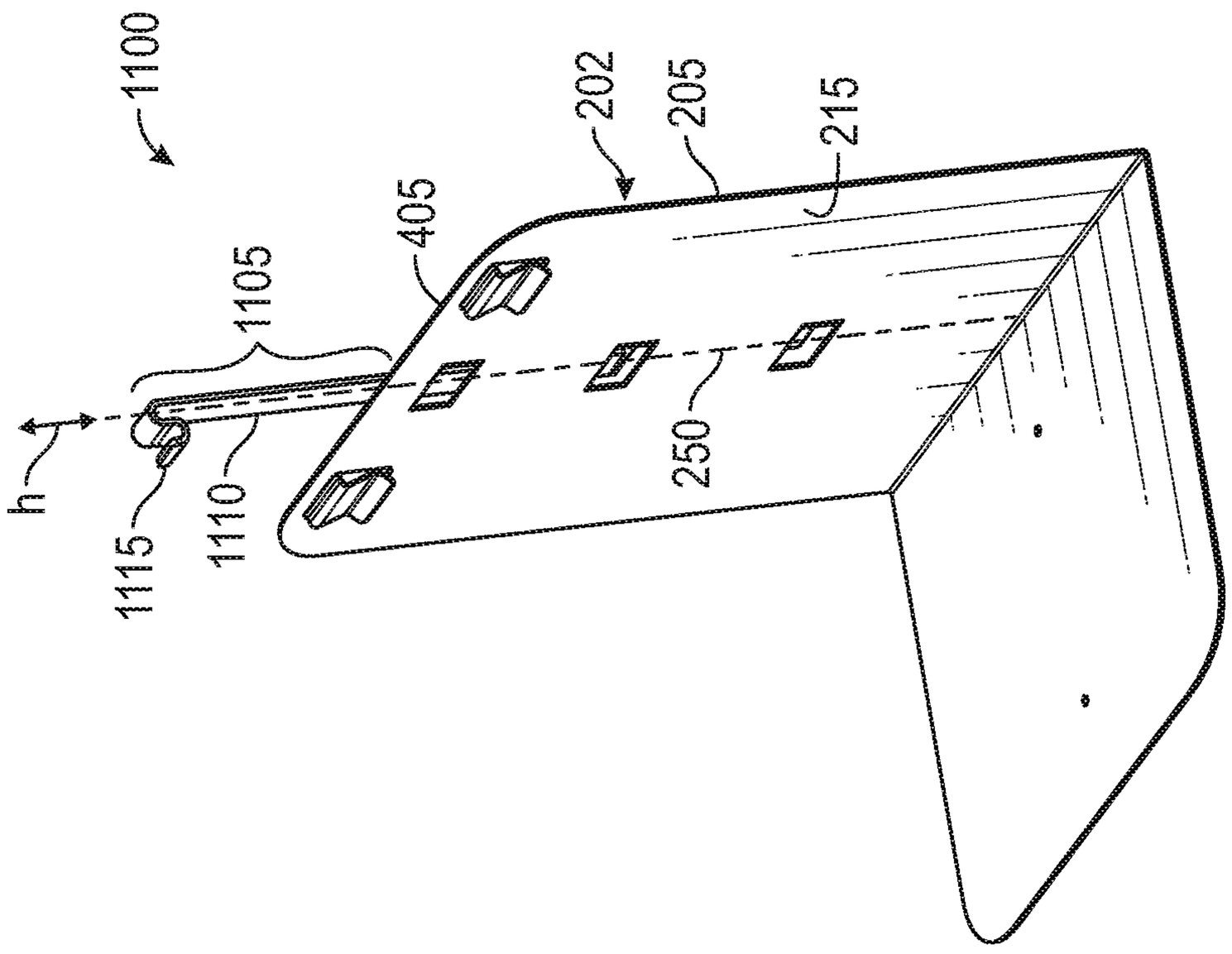

1100
1105
202
205
215
405
h
1115
1110
250

FIG. 11

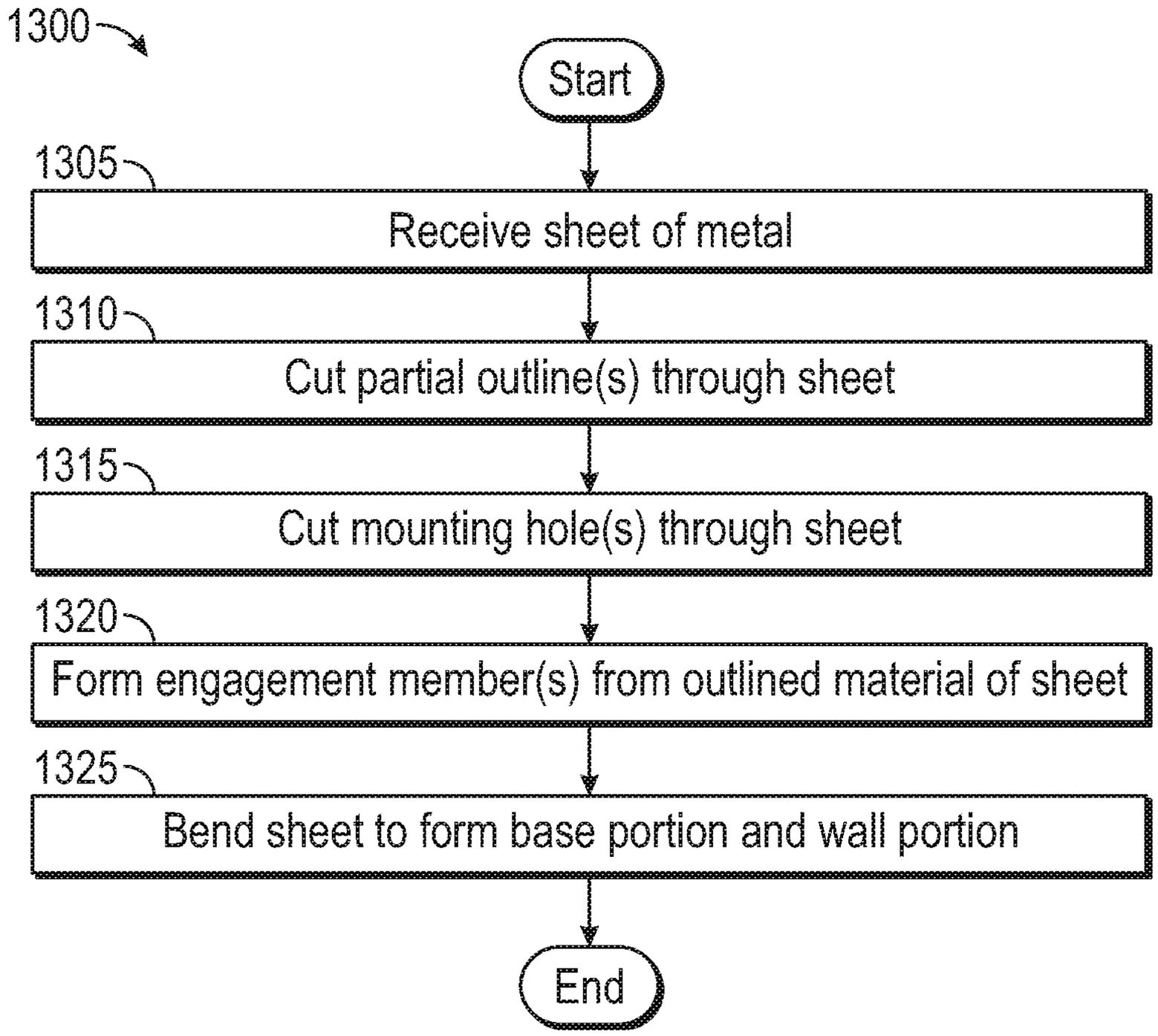

1300
Start
1305
Receive sheet of metal
1310
Cut partial outline(s) through sheet
1315
Cut mounting hole(s) through sheet
1320
Form engagement member(s) from outlined material of sheet
1325
Bend sheet to form base portion and wall portion
End

FIG. 13

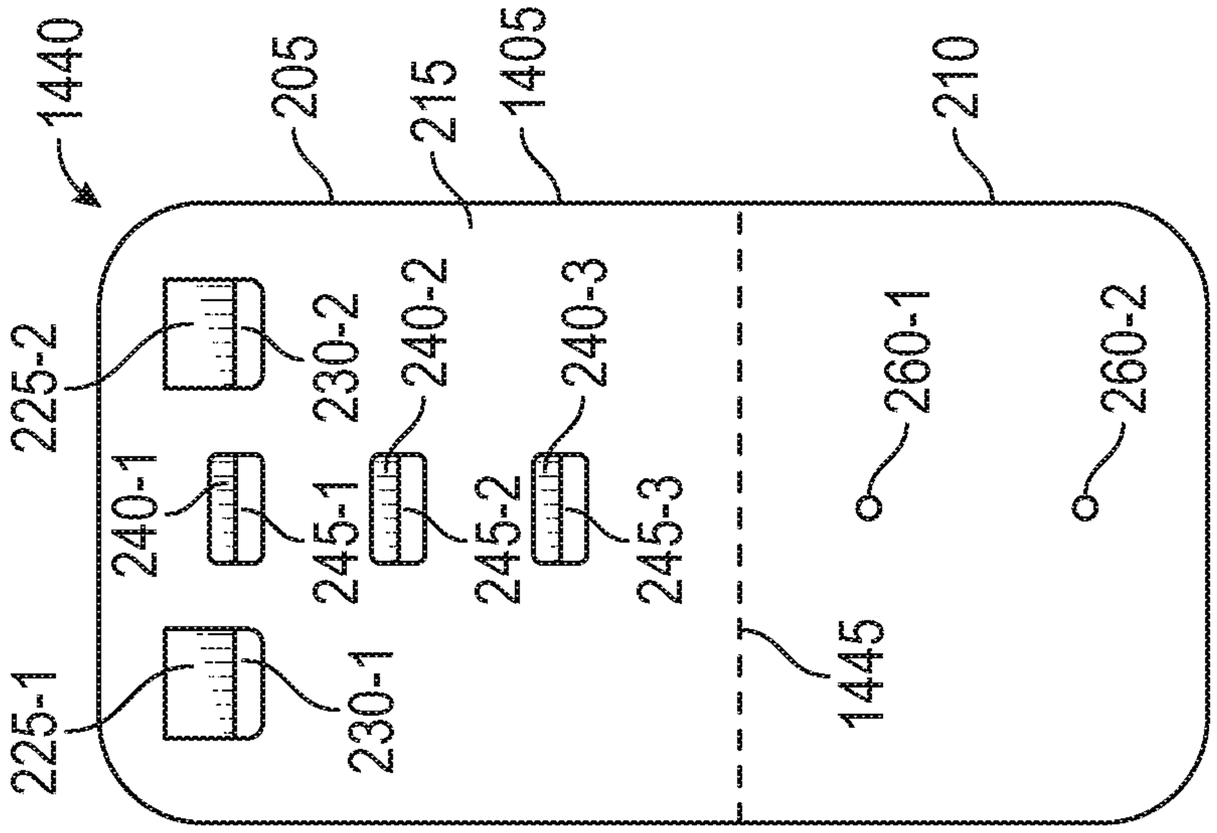


FIG. 14C

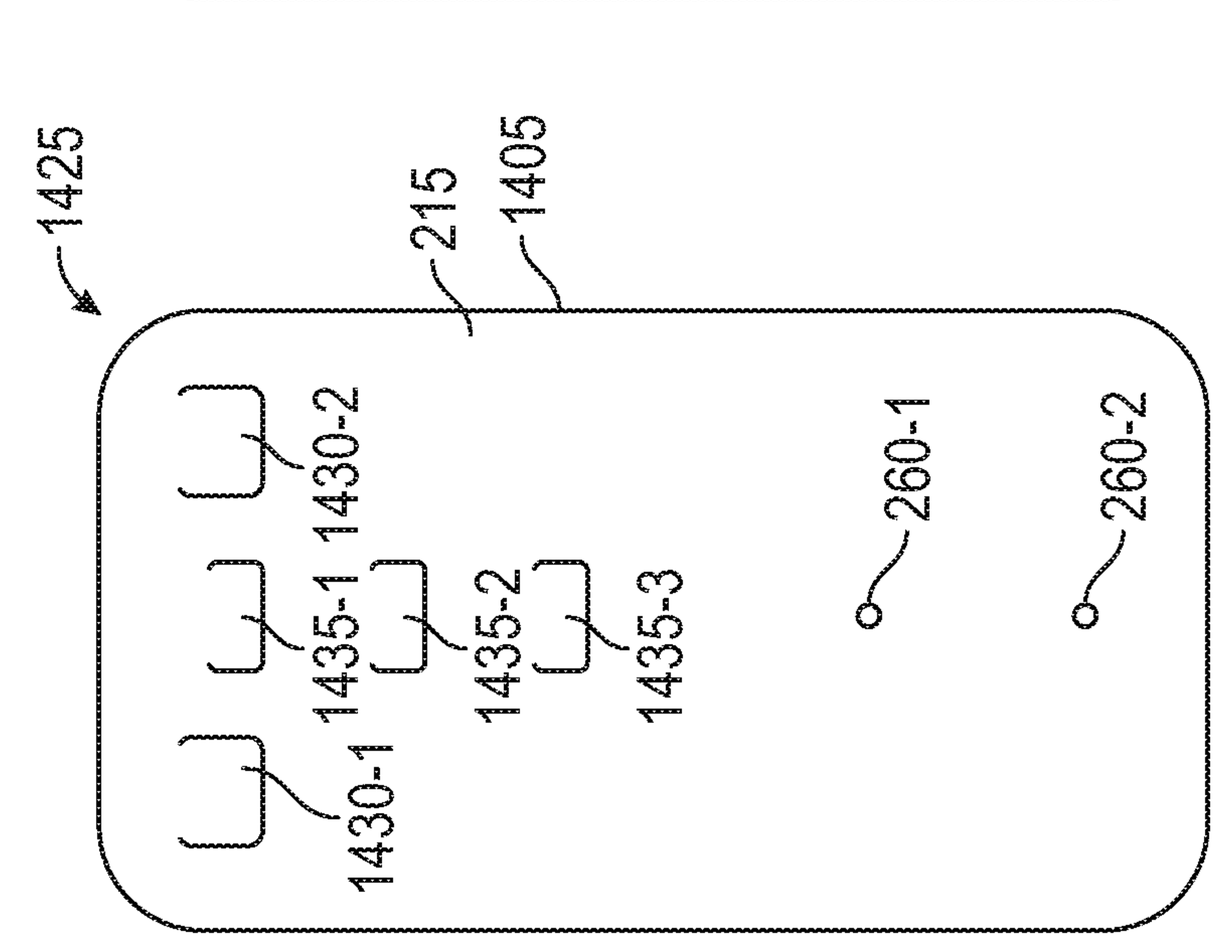


FIG. 14B

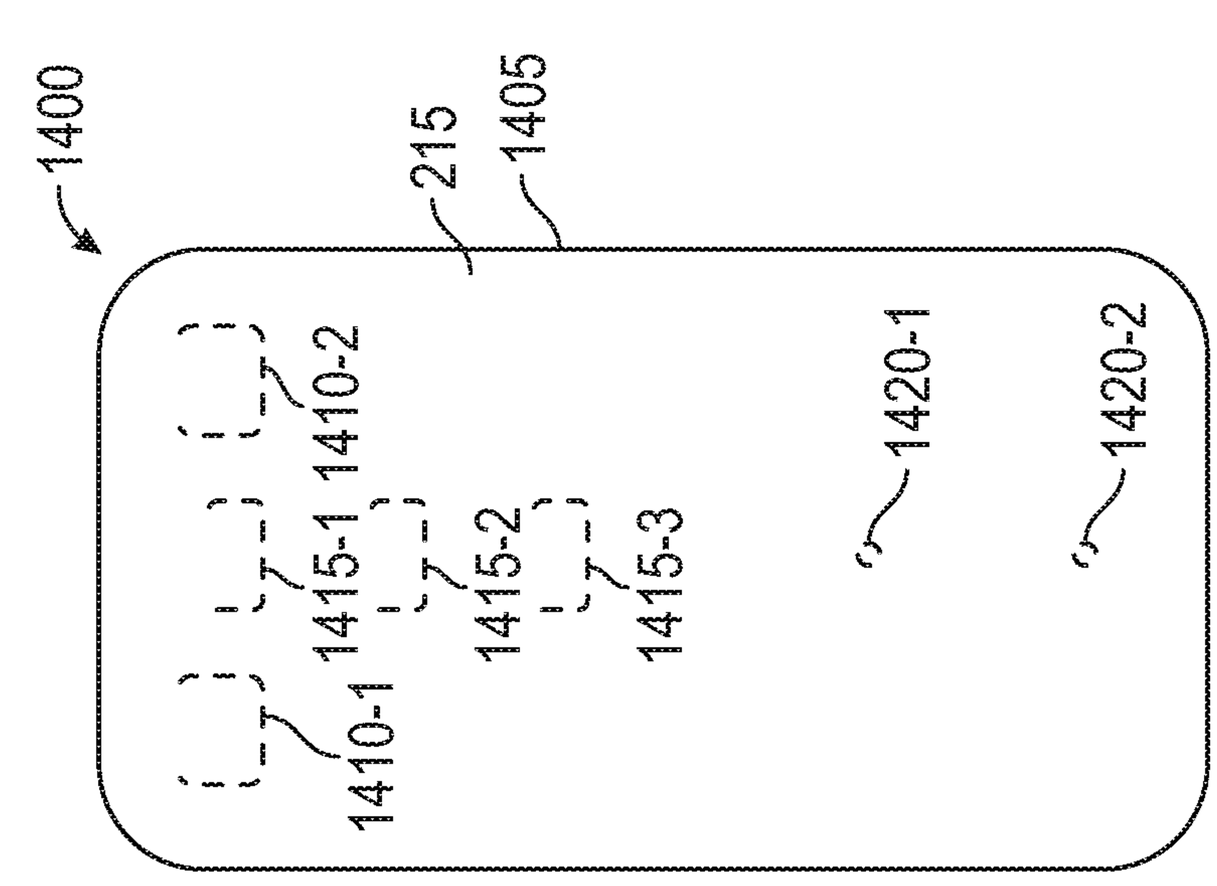


FIG. 14A

RETAINING COLLAPSIBLE TOTES

BACKGROUND

The present disclosure relates to checkout systems, and more specifically to an apparatus for retaining collapsible totes.

Reusable totes (which are sometimes referred to as "reusable shopping bags", "reusable grocery bags," and so forth) have increased in popularity as an environmentally-friendly alternative to single-use plastic bags. Further, several cities and states have enacted legislation limiting or eliminating the use of single-use plastic bags (sometimes referred to as "t-shirt bags"). However, current bagging stations are primarily focused on dispensing and/or retaining the single-use plastic bags during the bagging process, and are not well-adapted for the structural differences (dimensioning, sidewall strength, weight capacity, etc.) of the reusable totes.

SUMMARY

According to one embodiment, an apparatus for retaining a collapsible tote comprises a wall member and one or more engagement members projecting from one or more surfaces of the wall member. The one or more engagement members are arranged and dimensioned to removably engage respective portions of the collapsible tote, thereby suspending the collapsible tote beside a first surface of the one or more surfaces. The wall member is inclined such that, when the collapsible tote is suspended beside the first surface, the collapsible tote is gravitationally urged toward an uncollapsed configuration.

According to another embodiment, an apparatus for retaining a reusable tote comprises a wall member defining a first surface and an opposing second surface, one or more biased members at the first surface, and one or more hanger members at the second surface. The one or more biased members are arranged and dimensioned to engage an interior surface of a sidewall of the reusable tote, whereby the reusable tote is suspended beside the first surface. The one or more hanger members are arranged and dimensioned to engage a handle of the reusable tote that is connected with the sidewall, whereby the reusable tote is suspended beside the first surface.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

So that the manner in which the above recited aspects are attained and can be understood in detail, a more particular description of embodiments of the disclosure, briefly summarized above, may be had by reference to the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical embodiments of the disclosure and are therefore not to be considered limiting of its scope, for the disclosure may admit to other equally effective embodiments.

FIG. **1**A illustrates an exemplary implementation of a self-checkout system with bagging stations on multiple levels, according to one or more embodiments.

FIG. **1**B illustrates an exemplary implementation of a self-checkout system with bagging stations on a carousel, according to one or more embodiments.

FIGS. **2**A-**2**C are diagrams of an exemplary apparatus having engagement members projecting from multiple surfaces of a wall member, according to one or more embodiments.

FIGS. **3**A and **3**B illustrate engaging a collapsible tote with biased members to suspend the collapsible tote, according to one or more embodiments.

FIGS. **4**A and **4**B illustrate engaging a collapsible tote with hanger members to suspend the collapsible tote, according to one or more embodiments.

FIG. **5** illustrates exemplary implementations of biased members, according to one or more embodiments.

FIG. **6** illustrates exemplary implementations of hanger members, according to one or more embodiments.

FIG. **7** is a diagram of an exemplary apparatus having multiple hooks as hanger members, according to one or more embodiments.

FIGS. **8**A-**8**D illustrate engaging a handle of a collapsible tote with hanger members, according to one or more embodiments.

FIG. **9** is a diagram of an exemplary apparatus capable of retaining a collapsible tote and a single-use plastic bag, according to one or more embodiments.

FIG. **10**A, **10**B illustrate engaging portions of a single-use plastic bag, according to one or more embodiments.

FIG. **11** is a diagram of an exemplary apparatus capable of adjusting a height of one or more engagement members, according to one or more embodiments.

FIG. **12** is a diagram of an exemplary apparatus capable of adjusting height and width of engagement members, according to one or more embodiments.

FIG. **13** is an exemplary method of fabricating a tote-retaining apparatus, according to one or more embodiments.

FIGS. **14**A-**14**C illustrate exemplary stages of fabricating a tote-retaining apparatus, according to one or more embodiments.

DETAILED DESCRIPTION

Aspects of the current disclosure relate to an apparatus for retaining a collapsible tote. The apparatus comprises a wall member and one or more engagement members projecting from one or more surfaces of the wall member. The one or more engagement members are arranged and dimensioned to removably engage respective portions of the collapsible tote, which causes the collapsible tote to be suspended beside a first surface of the one or more surfaces. In some embodiments, the wall member is inclined such that, when the collapsible tote is suspended beside the first surface, the collapsible tote is gravitationally urged toward an uncollapsed configuration. In some embodiments, the one or more engagement members comprise biased member(s) at the first surface that engage an interior surface of a sidewall of the collapsible tote, and/or hanger member(s) at a second surface of the one or more surfaces.

Beneficially, the inclination of the wall member and/or use of the engagement members may ease the bagging process for customers and/or associates. For example, the engagement members permit the collapsible tote to be retained in a suspended configuration, freeing one or both hands of a customer to place items from a shopping cart into the collapsible tote. Further, the inclination of the wall member and/or use of the engagement members may maintain a main storage compartment of the collapsible tote in an open configuration, easing the process of placing items into the collapsible tote.

While features of the tote-retaining apparatus are generally discussed within the context of a shopping environment, such as within a self-checkout system of a retail store, it is contemplated that the techniques disclosed herein may be

applied to other environments (some non-limiting examples include libraries, museums, classrooms, hospitals, etc.).

FIG. **1**A illustrates an exemplary implementation of a self-checkout system **100** with bagging stations on multiple levels, according to one or more embodiments. The self-checkout system **100** generally has functionality supporting some or all of the stages of a self-checkout transaction, such as scanning items, weighing items, bagging items, and presenting payment.

The self-checkout system **100** comprises a display **105** that presents information viewable by a user (e.g., a customer or an associate) during various stages of a self-checkout transaction. The display **105** is communicatively coupled with one or more computer processors, which may be integrated with the self-checkout system **100** or external to the self-checkout system **100**. For example, the one or more computer processors may be included in a computing device integrated with the self-checkout system **100**, which may be further networked with other computing devices. In some embodiments, the display **105** comprises a display screen using any suitable display technology, such as a liquid crystal display (LCD), an organic light-emitting diode (OLED) display, and so forth. In some embodiments, the display **105** receives inputs from the user during the self-checkout transaction. For example, the display **105** may be implemented as a touch-sensitive screen using any suitable sensing technology, such as capacitive sensing, resistive sensing, and so forth.

The self-checkout system **100** further comprises an item scanner **110**. The item scanner **110** is communicatively coupled with the one or more computer processors, and in conjunction with the one or more computer processors visually identifies items during scanning. For example, the item scanner **110** may detect encoded portions (e.g., a Universal Product Code (UPC), a Quick Response (QR) code) and/or may compare imagery of the item with reference image(s) to identify a type of the item. In some embodiments, the item scanner **110** may further include one or more load cells for measuring weights of items.

The self-checkout system **100** further comprises a payment receiver **115**. In some embodiments, the payment receiver **115** comprises a credit card terminal communicatively coupled with the one or more computer processors. Other implementation of the payment receiver **115** are also contemplated. In other embodiments, the self-checkout transaction may be completed without the user presenting payment at the payment receiver **115** (e.g., charged by the one or more computer processors to a customer's account).

The self-checkout system **100** further comprises a printer **120** that prints or otherwise provides tangible items to the user. The printer **120** is communicatively coupled with the one or more computer processors. In some embodiments, the printer **120** generates paper receipts for the self-checkout transaction and/or coupons.

The self-checkout system **100** further comprises a bagging area **125** comprising a plurality of bagging stations **135-1**, **135-2**, **135-3** (generically, a bagging station **135**). As will be discussed in greater detail below, each bagging station **135** includes structure suitable for retaining at least one collapsible tote in a suspended configuration. In some embodiments, each bagging station **135** may also be suitable for dispensing and/or retaining single-use shopping bags.

As shown, the bagging stations **135-1**, **135-2** are disposed on a first platform **130**, and the bagging station **135-3** is disposed on a raised second platform **140**. Use of the first platform **130** and the second platform **140** allows for greater accessibility when bagging items, e.g., without requiring the user having to walk to the other side of the bagging area **125** to access the bagging station **135-3**). Other configurations of the bagging stations **135** are also contemplated.

FIG. **1**B illustrates another exemplary implementation of a self-checkout system **150** with bagging stations **135** on a carousel **165**, according to one or more embodiments. The self-checkout system **150** generally includes comparable structure and functionality to the self-checkout system **100**.

As shown, the bagging area **155** comprises a plurality of bagging stations **135-1**, **135-2**, **135-3**, **135-4** that are distributed around a circumference of, and attached to, the carousel **165**. Although not shown in the current view, the bagging area **155** may include additional bagging stations **135** on the far side of the carousel **165**.

The carousel **165** is capable of rotating relative to a base **160**. In other embodiments, the carousel **165** and the base **160** are rigidly connected and able to rotate together, e.g., relative to the floor or other surface on which the self-checkout system **150** is disposed. Attaching the bagging stations **135** to the carousel **165** allows for greater accessibility when bagging items, as a user may simply rotate the carousel **165** to access different bagging stations **135**.

FIGS. **2**A-**2**C are diagrams **200**, **265**, **270** of an exemplary apparatus (which may be referred to as a "tote-retaining apparatus") having engagement members projecting from multiple surfaces of a wall member, according to one or more embodiments. The features depicted in the diagrams **200**, **265**, **270** may be used in conjunction with other embodiments described herein. For example, each bagging station **135** of FIGS. **1**A and **1**B may include a respective instance of the apparatus.

The apparatus comprises a wall member **202**. In some embodiments, the wall member **202** defines a wall portion **205** projecting upwardly from a base portion **210**. The wall member **202** may be constructed of any suitable material(s) and may have any suitable dimensioning for retaining a collapsible tote. For example, the height of the wall portion **205** may be selected such that the collapsible tote may be suspended (e.g., not resting on the base portion **210** or on another surface beneath the wall portion **205**) when engaged with one or more engagement members of the wall member **202**, and the material(s) and thickness(es) of the wall member **202** selected to support the weight of the collapsible tote in addition to a predefined weight for items stored therein. For example, the wall member **202** may be dimensioned to support the collapsible tote and at least fifty (50) pounds of items. In some embodiments, the wall member **202** comprises a metal, such as spring steel or aluminum, having suitable yield strength to suspend the collapsible tote (and any items stored therein) without causing a plastic deformation of the wall member **202**.

In some embodiments, the wall portion **205** and the base portion **210** are integrally formed (e.g., formed from a single sheet of spring steel). Other techniques for attaching the wall portion **205** and the base portion **210** are also contemplated. For example, the wall portion **205** and the base portion **210** may be welded together or fastened together using a threaded fastener. In alternate implementations of the tote-retaining apparatus, the base portion **210** may be omitted (e.g., the wall portion **205** is attached to other structure of the bagging station).

In some embodiments, the base portion **210** has a horizontal orientation when the tote-retaining apparatus is arranged in a bagging station. In some embodiments, one or more openings **260-1**, **260-2** extend through the base portion **210**. Each of the openings **260-1**, **260-2** is dimensioned to receive a threaded fastener (e.g., a bolt) therethrough. In this

way, the wall member **202** may be removably attached (e.g., retrofitted) via the base portion **210** to other structure of the bagging station.

Other techniques for attaching the wall member **202** to the bagging station are also contemplated. In one example, the wall portion **205** may have one or more openings extending therethrough, allowing threaded fasteners to be received therethrough. In another example, the wall portion **205** may be integrated into the bagging station.

The wall portion **205** defines a first surface **215** and a second surface **220** opposing the first surface **215**. In some embodiments, the first surface **215** and the second surface **220** are substantially planar, extend parallel to each other, and are coextensive with each other. However, other shapes and relative orientations of the first surface **215** and the second surface **220** (including non-coextensive arrangements) are also contemplated.

In some embodiments, the first surface **215** is inclined with an inclination angle $\ominus$, which tends to gravitationally urge a collapsible tote toward an uncollapsed configuration when the collapsible tote is suspended beside the first surface **215**. Generally, the collapsible tote may be configured in a selected one of a collapsed configuration (e.g., where the main storage compartment of the collapsible tote is substantially closed, such as the collapsible tote is folded up) and an uncollapsed configuration (e.g., where the main storage compartment is opened and able to receive items).

In some embodiments, the inclination angle $\ominus$ is between about seven (7) degrees and about thirty (30) degrees less than a vertical orientation. For example, the inclination angle $\ominus$ may be between about ten (10) degrees and about twelve (12) degrees less than the vertical orientation. Other values of the inclination angle $\ominus$ are also contemplated, which may include a vertical orientation of the first surface **215**.

In some embodiments, the entire wall portion **205** is inclined with the inclination angle $\ominus$, and each of the first surface **215** and the second surface **215** is inclined with the inclination angle $\ominus$. In other embodiments, differing thicknesses of the wall portion **205** (which may be in combination with an inclination of the wall portion **205**) provide the first surface **215** with the inclination angle $\ominus$.

As shown, the first surface **215** is inclined in the direction of extent of the base portion **210** (e.g., forming an acute angle between the base portion **210** and the first surface **215**). In other implementations, the first surface **215** may be inclined away from the base portion **210** (e.g., forming an obtuse angle).

The apparatus further comprises one or more engagement members that project from one or more surfaces of the wall member **205**. In some embodiments, the one or more engagement members extend from the first surface **215**. In some embodiments, the one or more engagement members extend from the second surface **220**. In some embodiments, the one or more engagement members extend from each of the first surface **215** and the second surface **220**.

The one or more engagement members are arranged and dimensioned to removably engage respective portions of the collapsible tote, which thereby suspends the collapsible tote beside the first surface **215**. As mentioned above, the first surface **215** (or the wall portion **205**) may be inclined such that, when the collapsible tote is suspended beside the first surface **215**, the collapsible tote is gravitationally urged toward an uncollapsed configuration.

In some embodiments, the one or more engagement members comprise one or more biased members **225-1**, **225-2** at the first surface **215** and/or one or more hanger members **240-1**, **240-2**, **240-3**. The one or more biased members **225-1**, **225-2** are arranged and dimensioned to engage an interior surface of a sidewall of the collapsible tote. The biasing of the one or more biased members **225-1**, **225-2** may be provided by forming the one or more biased members **225-1**, **225-2** of a resilient material (e.g., spring steel), and/or by spring loading the one or more biased members **225-1**, **225-2**.

In some embodiments, the one or more biased members **225-1**, **225-2** are integrally formed with the wall member **202**. For example, the one or more biased members **225-1**, **225-2** may be formed from a same, single sheet of metal as the wall member **202**, such that cutting and shaping portions of the sheet to form the one or more biased members **225-1**, **225-2** causes openings **230-1**, **230-2** to be defined in the wall member **202**. The one or more biased members **225-1**, **225-2** may be shaped to extend partly into the openings **230-1**, **230-2**. In other embodiments, the one or more biased members **225-1**, **225-2** may be attached to the wall member **202** using any suitable means (e.g., welded, fastened together using a threaded fastener).

In some embodiments, and as shown in the diagram **200**, **265**, **270**, the one or more biased members **225-1**, **225-2** are implemented as a plurality of clips arranged as one or more pairs **235** of clips. Each pair **235** of the one or more pairs **235** of clips has a respective height h_1 along the first surface **215**. Although a single pair **235** is shown, other implementations may have multiple pairs **235** of clips arranged at different heights. The multiple pairs **235** may be beneficial to suspend different types of collapsible totes with different heights, to suspend the collapsible tote at a desired height, and so forth. In some embodiments, each pair **235** of the one or more pairs **235** of clips is distributed on opposing sides of a midline **250** of the wall member **202** (e.g., symmetrically arranged relative to the midline **250**).

The clips of each pair **235** engage the interior surface of the sidewall when the sidewall is slid between the first surface **215** and the clips. In some embodiments, the clips of each pair **235** engage the interior surface of the sidewall when the sidewall is slid upwardly (e.g., along the first surface **215**). In other embodiments, the sidewall may be slid in a different direction to engage the clips of each pair **235**. For example, in an alternate implementation the sidewall may be slid downwardly, and the clips of each pair **235** pass through corresponding openings in the sidewall (e.g., grommets) before engaging the sidewall.

The one or more hanger members **240-1**, **240-2**, **240-3** are arranged and dimensioned to engage a handle of the collapsible tote. In some embodiments, the one or more hanger members **240-1**, **240-2**, **240-3** are integrally formed with the wall member **202**. For example, the one or more hanger members **240-1**, **240-2**, **240-3** may be formed from a same, single sheet of metal as the wall member **202**, such that cutting and shaping portions of the sheet to form the one or more hanger members **240-1**, **240-2**, **240-3** causes openings **245-1**, **245-2**, **245-3** to be defined in the wall member **202**. In other embodiments, the one or more hanger members **240-1**, **240-2**, **240-3** may be attached to the wall member **202** using any suitable means (e.g., welded, fastened together using a threaded fastener).

In some embodiments, the one or more hanger members **240-1**, **240-2**, **240-3** comprise hooks, knobs, posts, and/or tabs that project outwardly from the second surface **220**. As shown, the one or more hanger members **240-1**, **240-2**, **240-3** comprise a plurality of first hooks having downward-facing throats and distributed along a height of the wall member. As shown, the plurality of first hooks are arranged

along the midline **250** as a single column **255**, and each of the first hooks has a respective height h_1, h_2, h_3. The one or more hanger members **240-1**, **240-2**, **240-3** may be beneficial to suspend different types of collapsible totes with different heights and/or different handle lengths, to suspend the collapsible tote at a desired height, and so forth.

In some embodiments, when the handle of the collapsible tote is engaged by the one or more hanger members **240-1**, **240-2**, **240-3**, the handle extends over a top of the wall member **202** to suspend the collapsible tote beside the first surface **215**. In other implementations, the handle may extend around the sides of the wall member **202**, may pass through an opening extending through the wall member **202**, etc. to suspend the collapsible tote beside the first surface **215**.

As will be discussed below with respect to FIG. **7**, the one or more hanger members **240-1**, **240-2**, **240-3** may further comprise a plurality of second hooks arranged as one or more pairs of second hooks. Each pair of the one or more pairs of second hooks may be distributed on opposing sides of the midline **250** with a respective height along the second surface **220**, and the second hooks of each pair have laterally-facing throats. In this way, the handle of the collapsible tote may engage with one or more first hooks (with downward-facing throats) and/or one or more second hooks (with laterally-facing throats) when the collapsible tote is suspended beside the first surface **215**.

FIGS. **3**A and **3**B illustrate engaging a collapsible tote **305** with biased members **225-1**, **225-2** to suspend the collapsible tote **305**, according to one or more embodiments. More specifically, diagrams **300**, **335** illustrate one mode of engaging the collapsible tote **305** with the tote-retaining apparatus depicted in FIG. **2**.

The diagram **300** provides a perspective view of the tote-retaining apparatus, and the diagram **335** provides a side view of the tote-retaining apparatus. The collapsible tote **305** comprises a first pair of opposing sidewalls **310-1**, **310-2**, which are connected to a second pair of opposing sidewalls **315-1**, **315-2** and to a base **340**. The connection of the sidewalls **310-1**, **310-2**, **315-1**, **315-2** and the base **340** defines a main storage compartment **320** of the collapsible tote **305**. The collapsible tote **305** further comprises handles **325-1**, **325-2** that are attached to respective sidewalls **310-1**, **310-2**.

The sidewalls **310-1**, **310-2**, **315-1**, **315-2**, the base **340**, and the handles **325-1**, **325-2** may be formed of any suitable material(s). Some non-limiting examples of suitable materials include fabric (e.g., canvas), woven natural fibers (e.g., calico, jute) or synthetic fibers, and plastics that are more durable than single-use plastic bags (e.g., non-woven polypropylene when compared to high-density polyethylene).

In some embodiments, the sidewalls **310-1**, **310-2**, **315-1**, **315-2** and the base **340** are formed of a same material. The handles **325-1**, **325-2** may be formed of the same material as the sidewalls **310-1**, **310-2**, **315-1**, **315-2** and the base **340**, or may be formed of different material(s). The handles **325-1**, **325-2** may be connected with the sidewalls **310-1**, **310-2** using any suitable techniques. In one non-limiting example, the sidewalls **310-1**, **310-2**, **315-1**, **315-2** and the base **340** are formed of canvas, and the handles **325-1**, **325-2** are formed of leather and stitched to the handles **325-1**, **325-2**.

In some embodiments, the sidewalls **310-1**, **310-2**, **315-1**, **315-2** may include one or more features that encourage the collapsible tote **305** into a collapsed configuration (e.g., where the main storage compartment **320** is substantially closed), such as when the collapsible tote **305** is compactly folded. For example, some or all of the sidewalls **310-1**, **310-2**, **315-1**, **315-2** may be creased, allowing the collapsible tote **305** to be preferentially collapsed at the creases. The collapsible tote **305** may further comprise a closing mechanism (e.g., hook-and-loop, snaps) capable of maintaining the collapsible tote **305** in the collapsed configuration.

As shown, the one or more biased members **225-1**, **225-2** are implemented as a plurality of clips. The clips engage the interior surface of the sidewall **310-1** when the sidewall **310-1** is slid upwardly (i.e., in the direction of arrow **330**) between the first surface **215** and the clips. Engaging the sidewall **310** causes the collapsible tote **305** to be suspended beside the first surface **215**. As mentioned above, when the collapsible tote **305** is suspended beside the first surface **215**, the collapsible tote **305** may be gravitationally urged toward an uncollapsed configuration. In the uncollapsed configuration, the main storage compartment **320** is able to receive items therein. The collapsible tote **305** may be detached from the tote-retaining apparatus by sliding the sidewall **310-1** in a downward direction with sufficient force to disengage the sidewall **310-1** from the clips.

FIGS. **4**A and **4**B illustrate engaging the collapsible tote **305** with hanger members **240-1**, **240-2**, **240-3** to suspend the collapsible tote **305**, according to one or more embodiments. More specifically, diagrams **400**, **410** illustrate another mode of engaging the collapsible tote **305** with the tote-retaining apparatus depicted in FIG. **2**.

The diagram **400** provides a perspective view of the tote-retaining apparatus, and the diagram **410** provides a side view of the tote-retaining apparatus. The handle **325-1** extends over a top **405** of the wall member **202** and is engaged with the hanger member **240-2** (e.g., a hook with a downward-facing throat) to thereby suspend the collapsible tote **305** beside the first surface **215**. The handle **325-1** may alternately be engaged with the hanger member **240-3** to raise the collapsible tote **305**, or with the hanger member **240-1** to lower the collapsible tote **305**.

As mentioned above, when the collapsible tote **305** is suspended beside the first surface **215**, the collapsible tote **305** may be gravitationally urged toward an uncollapsed configuration. The collapsible tote **305** may be detached from the tote-retaining apparatus by sliding the handle **325-1** in a downward direction with sufficient force to disengage the handle **325-1** from the hanger member **240-2**.

FIG. **5** illustrates exemplary implementations of biased members, according to one or more embodiments. The implementations of biased members illustrated in diagram **500** may be used in conjunction with other embodiments, such as in the tote-retaining apparatus depicted in FIG. **2**.

The diagram **500** includes clips **505**, **510** that are oriented in a downward direction. Stated another way, each of the clips **505**, **510** engages an interior surface of a sidewall when the sidewall is slid upwardly. The clips **505**, **510** may be constructed of a resilient material, such as spring steel. As shown, the clip **505** is wider than the clip **510**. In some embodiments, the clip **510** is dimensioned to pass through an opening in the sidewall (e.g., a grommet) before engaging the sidewall.

The diagram **500** further includes a hinged clip **515** that is oriented in the downward direction. The hinged clip **515** may be spring-loaded. Pressing an upper portion **520** of the hinged clip **515** counters the spring biasing of the hinged clip **515**. The hinged clip **515** rotates about a rotation axis **525**, and a lower portion **530** of the hinged clip **515** moves away from the first surface. The sidewall of the collapsible tote may be inserted between the lower portion **530** and the first

surface, and the upper portion **520** is released to engage the sidewall with the lower portion **530**.

Although the clips **505**, **510** and the hinged clip **515** are shown as downward-oriented, the clips **505**, **510** and the hinged clip **515** may have different orientations suitable for engaging with the sidewall. For example, the clips **505**, **510** and the hinged clip **515** may have an upward orientation, and may engage the sidewall when the sidewall is slid downwardly.

FIG. **6** illustrates exemplary implementations of hanger members, according to one or more embodiments. The implementations of hanger members illustrated in diagram **600** may be used in conjunction with other embodiments, such as in the tote-retaining apparatus depicted in FIG. **2**.

The diagram **600** includes a hook **605**, a knob **610**, a post **615**, and a tab **620**. Each of these, when projecting from the second surface of the tote-retaining apparatus, may engage a handle of the collapsible tote. The hook **605**, the knob **610**, the post **615**, and the tab **620** may have any suitable dimensioning and orientation.

FIG. **7** is a diagram **700** of an exemplary apparatus having multiple hooks as hanger members, according to one or more embodiments. More specifically, the tote-retaining apparatus depicted in the diagram **700** comprises the hanger members **240-1**, **240-2**, **240-3**, **240-4** arranged as a plurality of first hooks having downward-facing throats and distributed along a height of the wall member. The plurality of first hooks is arranged along the midline **250** of the wall member **202**. As shown, the hanger member **240-1** is at a first height h_1, and the hanger member **240-2** is at a second height h_2 less than the first height h_1.

The one or more hanger members of the tote-retaining apparatus further comprise a plurality of second hooks **715-1**, **715-2**, **715-3**, **715-4**, **715-5**, **715-6**. The plurality of second hooks **715-1**, **715-2**, **715-3**, **715-4**, **715-5**, **715-6** are arranged as one or more pairs **710-1**, **710-2**, **710-3** of second hooks. As shown, the pair **710-1** includes the second hooks **715-1**, **715-2**, the pair **710-2** includes the second hooks **715-3**, **715-4**, and the pair **710-3** includes the second hooks **715-5**, **715-6**. Each pair **710-1**, **710-2**, **710-3** is distributed on opposing sides of the midline **250** with a respective height along the second surface **220**. As shown, the pair **710-1** is at the first height h_1, the pair **710-2** is at the second height h_2, and the pair **710-3** is at a third height h_3 less than the second height h_2. The second hooks of each pair **710-1**, **710-2**, **710-3** have laterally-facing throats.

The tote-retaining apparatus further comprises tabs **705-1**, **705-2** formed at lateral edges of the top **405** of the wall member **202**, which limit the lateral motion of the handle when extended over the top **405**. Stated another way, the tabs **705-1**, **705-2** are dimensioned and arranged to prevent the handle from sliding along the top **405** and sliding off of the wall member **202**. Although the tabs **705-1**, **705-2** are illustrated as being coplanar with the wall member **202**, other arrangements suitable for limiting the motion of the handle are also contemplated.

FIGS. **8**A-**8**D illustrate engaging the handle **325-1** of a collapsible tote with hanger members, according to one or more embodiments. The features illustrated in diagrams **800**, **805**, **810**, **815** may be used in conjunction with other embodiments, such as in the tote-retaining apparatus depicted in FIG. **7**. More specifically, the diagrams **800**, **805**, **810**, **815** illustrate several possible configurations of the handle with portions of the tote-retaining apparatus of FIG. **7** above line A-A.

In the diagram **800**, the handle **325-1** is engaged with the hanger member **240-1** (e.g., a hook with a downward-facing throat), and the handle **325-1** extends over the top **405** of the wall member **202** between the tabs **705-1**, **705-2**. In this way, the collapsible tote may be suspended beside the first surface (i.e., opposing the second surface **220**) of the wall member **202**. In the diagram **805**, the handle **325-1** is engaged with the second hooks **715-1**, **715-2** and extends over the top **405** of the wall member **202**. In the diagram **810**, the handle **325-1** is engaged with the hanger member **240-2** and with the second hooks **715-1**, **715-2** and extends over the top **405** of the wall member **202**. In the diagram **815**, the handle **325-1** is engaged with second hooks **715-1**, **715-2**, **715-3**, **715-4** and extends over the top **405** of the wall member **202**.

FIG. **9** is a diagram **900** of an exemplary apparatus capable of retaining a collapsible tote and a single-use plastic bag, according to one or more embodiments. The features illustrated in the diagram **900** may be used in conjunction with other embodiments, such as with the tote-retaining apparatus of FIGS. **2** and **7**.

In the diagram **900**, the tote-retaining apparatus comprises one or more second engagement members projecting from the first surface **215**. In some embodiments, the one or more second engagement members may be integrally formed with the wall member **202**. In other embodiments, the one or more second engagement members may be separately formed and attached to the wall member **202** using any suitable means.

In some embodiments, the one or more second engagement members comprise a hook **905** extending from the first surface **215** near the top **405**. The hook **905** is shown as being arranged at the midline **250** of the wall member **202** and having an upward orientation, but other arrangements and orientations are also contemplated. The hook **905** is dimensioned to removably engage a handle **1010-1** of a single-use plastic bag **1005**, as illustrated in diagram **1000** of FIG. **10**A. When the hook **905** is engaged with the handle **1010-1**, the single-use plastic bag **1005** is suspended beside the first surface **215**. In some cases, when the hook **905** is engaged with the handle **1010-1**, a body **1015** of the single-use plastic bag **1005** may be positioned such that a main storage compartment **1020** is in an open configuration, easing the process of placing items into the main storage compartment **1020**.

In some embodiments, the one or more second engagement members comprise arms **910-1**, **910-2** arranged at lateral ends of the first surface **215**. The arms **910-1**, **910-2** extend from the first surface **215** with any suitable inclination. For example, the arms **910-1**, **910-2** may be substantially horizontal (or parallel to the base portion **210**) or may extend substantially perpendicular to the first surface **215** (e.g., based on an inclination of the first surface **215**).

The arms **910-1**, **910-2** are dimensioned to removably engage respective handles **1010-1**, **1010-2** of the single-use plastic bag **1005**, as illustrated in diagram **1025** of FIG. **10**B. When the arms **910-1**, **910-2** are engaged with the handles **1010-1**, **1010-2**, the single-use plastic bag **1005** is suspended beside the first surface **215**. In some cases, when the arms **910-1**, **910-2** are engaged with the handles **1010-1**, **1010-2**, the body **1015** of the single-use plastic bag **1005** may be positioned such that the main storage compartment **1020** is in an open configuration, easing the process of placing items into the main storage compartment **1020**.

Each of the arms **910-1**, **910-2** has a respective tab **915-1**, **915-2** at its extent. The tabs **915-1**, **915-2** limit the motion of the single-use plastic bag **1005** when engaged with the arms. Stated another way, the tabs **915-1**, **915-2** are dimensioned and arranged to prevent the handles **1010-1**, **1010-2** of the single-use plastic bag **1005** from sliding along the tops

of the arms **910-1**, **910-2** and sliding off of the arms **910-1**, **910-2** entirely. Although the tabs **915-1**, **915-2** are illustrated as being substantially coplanar with the respective arms **910-1**, **910-2**, other arrangements suitable for limiting the motion of the handles **1010-1**, **1010-2** are also contemplated.

FIG. **11** is a diagram **1100** of an exemplary apparatus capable of adjusting a height of one or more engagement members, according to one or more embodiments. The features illustrated in the diagram **1100** may be used in conjunction with other embodiments, such as with the tote-retaining apparatus of FIGS. **2**, **7**, and **9**.

In the diagram **1100**, the tote-retaining apparatus comprises an engagement assembly **1105** that engages one or more portions of a collapsible tote and/or a single-use plastic bag, and that is extendible in a vertical dimension. The engagement assembly **1105** comprises one or more second engagement members (as shown, a hook **1115**) arranged and dimensioned to removably engage respective portions of the collapsible tote (and/or the single-use plastic bag), and an extension member **1110** connected with the one or more second engagement members. The extension member **1110** is adjustably connected with the wall member **202** to arrange the one or more second engagement members at heights h that are greater than a height of the wall member **202**. In some embodiments, the extension member **1110** comprises an elongated member slidingly engaged in a groove or slot formed at the second surface (opposite the first surface **215**) of the wall member **202**. The extension member **1110** and the hook **1115** may be formed of any suitable material(s) for supporting the weight of the collapsible tote (and any items stored therein). In some embodiments, the extension member **1110** and the hook **1115** are formed of a same material as the wall member **202**. Although not shown, the apparatus may further comprise a mechanism for retaining the elongated member with a desired height h.

In some embodiments, the elongated member has a longitudinal axis extending in parallel with the midline **250** of the wall member **202**. The hook **1115** extends from an end of the elongated member, and has an upward-facing throat dimensioned to engage a handle of the collapsible tote (and/or the single-use plastic bag). The extendible nature of the engagement assembly **1105** may be beneficial to suspend different types of collapsible totes with different heights and/or different handle lengths, to suspend the collapsible tote at a desired height, and so forth.

FIG. **12** is a diagram **1200** of an exemplary apparatus capable of adjusting height and width of engagement members, according to one or more embodiments. The features illustrated in the diagram **1200** may be used in conjunction with other embodiments, such as with the tote-retaining apparatus of FIGS. **2**, **7**, and **9**.

In the diagram **1200**, the engagement assembly **1105** comprises two extension members **1205-1**, **1205-2** adjustably connected with the wall member **202**. Each of the extension members **1205-1**, **1205-2** is received in a respective comprises an elongated member slidingly engaged in a respective groove or slot formed at the second surface (opposite the first surface **215**) of the wall member **202**. As shown, each of the extension members **1205-1**, **1205-2** is exposed at a respective opening **1210-1**, **1210-2** formed in the wall member **202**. The extension members **1205-1**, **1205-2** are adjustably connected with the wall member **202** to arrange the second engagement members at heights h that are greater than a height of the wall member **202**. Although not shown, the apparatus may further comprise a mechanism for retaining the extension members **1205-1**, **1205-2** with a desired height h.

The extension members **1205-1**, **1205-2** is connected with a horizontal member **1215** having horizontal slots **1220-1**, **1220-2** defined therethrough. The engagement assembly **1105** further comprises two second engagement members (implemented as posts **1225-1**, **1225-2**) that are slidingly engaged with the horizontal member **1215** at a respective horizontal slot **1220-1**, **1220-2**. In this way, the two second engagement members are adjustably connected with the extension members **1205-1**, **1205-2** to control a width w between the two second engagement members. Although not shown, the engagement assembly **1105** may further comprise a mechanism for retaining the two second engagement members with a desired width w.

The extension members **1205-1**, **1205-2**, the horizontal member **1215**, and the posts **1225-1**, **1225-2** may be formed of any suitable material(s) for supporting the weight of the collapsible tote (and any items stored therein). In some embodiments, the extension members **1205-1**, **1205-2**, the horizontal member **1215**, and the posts **1225-1**, **1225-2** are formed of a same material as the wall member **202**.

The extendible nature of the engagement assembly **1105** may be beneficial to suspend different types of collapsible totes with different dimensioning (heights and/or widths), to suspend collapsible totes with different handle lengths and/or handle spacing, to suspend the collapsible tote with a desired height, to provide a desired degree of opening the main storage compartment of the collapsible tote, and so forth.

FIG. **13** is an exemplary method **1300** of fabricating a tote-retaining apparatus, according to one or more embodiments. The method **1300** may be used in conjunction with other embodiments, such as fabricating the tote-retaining apparatus of FIGS. **2**, **7**, **9**, **11**, and **12**.

The method **1300** begins at block **1305**, where a sheet of metal is received. Some non-limiting examples of the type of metal include spring steel and aluminum. At block **1310**, one or more partial outlines are cut through the sheet. At block **1315**, one or more mounting holes are cut through the sheet. The cutting operations of blocks **1310**, **1315** may be performed using any suitable cutting tool. In some embodiments, the cutting operation is performed by a laser cutter.

Referring also to FIG. **14**A, in which diagram **1400** illustrates a first stage of fabricating the tote-retaining apparatus, a plurality of partial outlines **1410-1**, **1410-2**, **1415-1**, **1415-2**, **1415-3** and a plurality of outlines **1420-1**, **1420-2** are illustrated relative to a sheet **1405** of metal. Corresponding to the implementation of the tote-retaining apparatus of FIG. **2**, the partial outlines **1410-1**, **1410-2** correspond to biased members to be formed at the first surface **215**, and the partial outlines **1415-1**, **1415-2**, **1415-3** correspond to hanger members to be formed at the second surface (opposite the first surface **215**). The plurality of outlines **1420-1**, **1420-2** correspond to mounting holes for the tote-retaining apparatus (e.g., openings that are each dimensioned to receive a threaded fastener therethrough).

At block **1320**, one or more engagement members are formed from the outlined material of the sheet **1405**. In some embodiments, the one or more engagement members comprise one or more biased members at the first surface **215** and/or one or more hanger members. Referring also to FIGS. **14**B and **14**C, in which diagrams **1425**, **1440** respectively illustrate second and third stages of fabricating the tote-retaining apparatus, the cutting operations define outlined material **1430-1**, **1430-2** that is used to form the biased members **225-1**, **225-2**, outlined material **1435-1**, **1435-2**,

1435-3 that is used to form the hanger members 240-1, 240-2, 240-3, and openings 260-1, 260-2 that are used as mounting holes.

The one or more engagement members may be formed using any suitable techniques. In some embodiments, a forming die is used to bend (or otherwise deform) the outlined material 1430-1, 1430-2, 1435-1, 1435-2, 1435-3 into the desired shapes. In some embodiments, forming the one or more engagement members causes the openings 230-1, 230-2, 245-1, 245-2, 245-3 to be defined in the sheet 1405.

At block 1325, the sheet is bent to form a base portion and a wall portion. Referring also to FIG. 14C, the sheet 1405 is bent along a bend axis 1445 to define the base portion 210 and the wall portion 205. The sheet 1405 may be bent to provide any suitable relative inclination between the base portion 210 and the wall portion 205. In some embodiments, a forming die is used to bend the sheet 1405. The method 1300 ends following completion of block 1325.

The descriptions of the various embodiments of the present invention have been presented for purposes of illustration, but are not intended to be exhaustive or limited to the embodiments disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art without departing from the scope and spirit of the described embodiments. The terminology used herein was chosen to best explain the principles of the embodiments, the practical application or technical improvement over technologies found in the marketplace, or to enable others of ordinary skill in the art to understand the embodiments disclosed herein.

In the preceding, reference is made to embodiments presented in this disclosure. However, the scope of the present disclosure is not limited to specific described embodiments. Instead, any combination of the features and elements described herein, whether related to different embodiments or not, is contemplated to implement and practice contemplated embodiments. Furthermore, although embodiments disclosed herein may achieve advantages over other possible solutions or over the prior art, whether or not a particular advantage is achieved by a given embodiment is not limiting of the scope of the present disclosure. Thus, the aspects, features, embodiments and advantages described herein are merely illustrative and are not considered elements or limitations of the appended claims except where explicitly recited in a claim(s). Likewise, reference to "the invention" shall not be construed as a generalization of any inventive subject matter disclosed herein and shall not be considered to be an element or limitation of the appended claims except where explicitly recited in a claim(s).

Aspects of the present invention may take the form of an entirely hardware embodiment, an entirely software embodiment (including firmware, resident software, micro-code, etc.) or an embodiment combining software and hardware aspects that may all generally be referred to herein as a "circuit," "module" or "system."

The present invention may be a system, a method, and/or a computer program product. The computer program product may include a computer readable storage medium (or media) having computer readable program instructions thereon for causing a processor to carry out aspects of the present invention.

The computer readable storage medium can be a tangible device that can retain and store instructions for use by an instruction execution device. The computer readable storage medium may be, for example, but is not limited to, an electronic storage device, a magnetic storage device, an optical storage device, an electromagnetic storage device, a semiconductor storage device, or any suitable combination of the foregoing. A non-exhaustive list of more specific examples of the computer readable storage medium includes the following: a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), a static random access memory (SRAM), a portable compact disc read-only memory (CD-ROM), a digital versatile disk (DVD), a memory stick, and any suitable combination of the foregoing. A computer readable storage medium, as used herein, is not to be construed as being transitory signals per se, such as radio waves or other freely propagating electromagnetic waves, electromagnetic waves propagating through a waveguide or other transmission media (e.g., light pulses passing through a fiber-optic cable), or electrical signals transmitted through a wire.

Computer readable program instructions described herein can be downloaded to respective computing/processing devices from a computer readable storage medium or to an external computer or external storage device via a network, for example, the Internet, a local area network, a wide area network and/or a wireless network. The network may comprise copper transmission cables, optical transmission fibers, wireless transmission, routers, firewalls, switches, gateway computers and/or edge servers. A network adapter card or network interface in each computing/processing device receives computer readable program instructions from the network and forwards the computer readable program instructions for storage in a computer readable storage medium within the respective computing/processing device.

Computer readable program instructions for carrying out operations of the present invention may be assembler instructions, instruction-set-architecture (ISA) instructions, machine instructions, machine dependent instructions, microcode, firmware instructions, state-setting data, or either source code or object code written in any combination of one or more programming languages, including an object oriented programming language such as Smalltalk, C++ or the like, and conventional procedural programming languages, such as the "C" programming language or similar programming languages. The computer readable program instructions may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider). In some embodiments, electronic circuitry including, for example, programmable logic circuitry, field-programmable gate arrays (FPGA), or programmable logic arrays (PLA) may execute the computer readable program instructions by utilizing state information of the computer readable program instructions to personalize the electronic circuitry, in order to perform aspects of the present invention.

Aspects of the present invention are described herein with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems), and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the

flowchart illustrations and/or block diagrams, can be implemented by computer readable program instructions.

These computer readable program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks. These computer readable program instructions may also be stored in a computer readable storage medium that can direct a computer, a programmable data processing apparatus, and/or other devices to function in a particular manner, such that the computer readable storage medium having instructions stored therein comprises an article of manufacture including instructions which implement aspects of the function/act specified in the flowchart and/or block diagram block or blocks.

The computer readable program instructions may also be loaded onto a computer, other programmable data processing apparatus, or other device to cause a series of operational steps to be performed on the computer, other programmable apparatus or other device to produce a computer implemented process, such that the instructions which execute on the computer, other programmable apparatus, or other device implement the functions/acts specified in the flowchart and/or block diagram block or blocks.

The flowchart and block diagrams in the FIGS. illustrate the architecture, functionality, and operation of possible implementations of systems, methods, and computer program products according to various embodiments of the present invention. In this regard, each block in the flowchart or block diagrams may represent a module, segment, or portion of instructions, which comprises one or more executable instructions for implementing the specified logical function(s). In some alternative implementations, the functions noted in the block may occur out of the order noted in the FIGS. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. It will also be noted that each block of the block diagrams and/or flowchart illustration, and combinations of blocks in the block diagrams and/or flowchart illustration, can be implemented by special purpose hardware-based systems that perform the specified functions or acts or carry out combinations of special purpose hardware and computer instructions.

While the foregoing is directed to embodiments of the present invention, other and further embodiments of the invention may be devised without departing from the basic scope thereof, and the scope thereof is determined by the claims that follow.

What is claimed is:

1. An apparatus for retaining a collapsible tote, the apparatus comprising:

a wall member formed in a sheet of metal; and

one or more engagement members projecting from one or more surfaces of the wall member,

wherein the one or more engagement members are formed from the sheet,

wherein the one or more engagement members are configured to removably engage respective portions of the collapsible tote, thereby suspending the collapsible tote beside a first surface of the one or more surfaces,

wherein the one or more engagement members comprise:

one or more biased members projecting from the first surface, the one or more biased members configured to engage an interior surface of a sidewall of the collapsible tote, and

wherein the wall member is inclined such that, when the collapsible tote is suspended beside the first surface, the collapsible tote is gravitationally urged toward an uncollapsed configuration.

2. The apparatus of claim **1**, wherein the first surface is inclined between seven (7) degrees and thirty (30) degrees less than a vertical orientation.

3. The apparatus of claim **1**, wherein the one or more biased members comprise:

a plurality of clips arranged as one or more pairs of clips, wherein each pair of the one or more pairs of clips has a respective height along the first surface, and wherein, for each pair of the one or more pairs, the clips of the pair are configured to engage the interior surface of the sidewall when the sidewall is slid between the first surface and the clips of the pair.

4. The apparatus of claim **3**, wherein, for each pair of the one or more pairs, the clips of the pair are configured to engage the interior surface of the sidewall when the sidewall is slid upwardly.

5. The apparatus of claim **3**, wherein the clips of each pair of the one or more pairs of cups is distributed on opposing sides of a midline of the wall member.

6. The apparatus of claim **1**, further comprising:

an engagement assembly comprising:

one or more second engagement members arranged and dimensioned to removably engage respective portions of the collapsible tote; and

an extension member connected with the one or more second engagement members, wherein the extension member is adjustably connected with the wall member to arrange the one or more second engagement members at heights greater than a height of the wall member.

7. The apparatus of claim **6**, wherein the one or more second engagement members comprise:

two second engagement members adjustably connected with the extension member to control a width between the two second engagement members.

8. The apparatus of claim **1**, further comprising:

one or more second engagement members projecting from the first surface, the one or more second engagement members arranged and dimensioned to removably engage respective portions of a single-use plastic bag, thereby suspending the single-use plastic bag beside the first surface.

9. The apparatus of claim **1**, further comprising:

a base portion formed from the sheet,

wherein the base portion and the wall member are formed by bending the sheet.

10. The apparatus of claim **9**, wherein the base portion and the wall member are formed by bending the sheet along a bend axis.

11. The apparatus of claim **1**, wherein the one or more engagement members are formed using a forming die to bend the sheet.

12. An apparatus for retaining a collapsible tote, the apparatus comprising:

a wall member; and

one or more engagement members projecting from one or more surfaces of the wall member,

wherein the one or more engagement members are configured to removably engage respective portions of the

collapsible tote, thereby suspending the collapsible tote beside a first surface of the one or more surfaces,

wherein the one or more engagement members comprise:

one or more hanger members at a second surface of the wall member opposing the first surface, the one or more hanger members configured to engage a handle of the collapsible tote,

wherein the wall member is inclined such that, when the collapsible tote is suspended beside the first surface, the collapsible tote is gravitationally urged toward an uncollapsed configuration.

13. The apparatus of claim **12**, wherein the handle of the collapsible tote, when engaged by the one or more hanger members, extends over a top of the wall member.

14. The apparatus of claim **12**, wherein the one or more hanger members comprise either hooks, knobs, posts, or tabs that project outwardly from the second surface.

15. The apparatus of claim **12**, wherein the one or more hanger members comprise:

a plurality of first hooks having downward-facing throats and distributed along a height of the wall member.

16. The apparatus of claim **15**, wherein the plurality of first hooks are arranged along a midline of the wall member, and

wherein the one or more hanger members further comprise:

a plurality of second hooks arranged as one or more pairs of second hooks, wherein the hooks of each pair of the one or more pairs of second hooks is distributed on opposing sides of the midline with a respective height along the second surface, and wherein the second hooks of each pair have laterally-facing throats.

17. An apparatus for retaining a reusable tote, the apparatus comprising:

a wall member defining a first surface and an opposing second surface;

one or more biased members extending from the first surface, the one or more biased members configured to engage an interior surface of a sidewall of the reusable tote, wherein engaging the interior surface with the one or more biased members suspends the reusable tote beside the first surface, wherein the one or more biased members comprise:

a plurality of clips arranged as one or more pairs of clips, wherein each pair of the one or more pairs of clips has a respective height along the first surface, wherein the clips of each pair are configured to engage the interior surface of the sidewall when the sidewall is slid upwardly between the first surface and the clips of the pair; and

one or more hanger members extending from the second surface, the one or more hanger members configured to engage a handle of the reusable tote that is connected with the sidewall, wherein engaging the handle of the reusable tote with the one or more hanger members suspends the reusable tote beside the first surface.

18. The apparatus of claim **17**, wherein one or both of: (i) the one or more biased members, and (ii) the one or more hanger members are integrally formed with the wall member.

19. The apparatus of claim **17**, wherein the wall member is inclined such that, when the reusable tote is suspended beside the first surface, the reusable tote is gravitationally urged toward an uncollapsed configuration.

20. The apparatus of claim **17**, wherein the one or more hanger members comprise:

a plurality of first hooks having downward-facing throats and distributed along a height of the wall member, wherein the plurality of first hooks are arranged along a midline of the wall member, and

wherein the clips of each pair of the one or more pairs of clips is distributed on opposing sides of the midline.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 11,136,156 B1
APPLICATION NO. : 16/834519
DATED : October 5, 2021
INVENTOR(S) : Barr

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

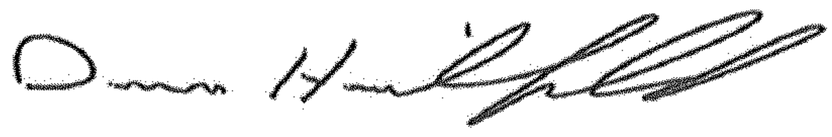
In the Specification

In Column 2, Line 21, delete "FIG." and insert -- FIGS. --, therefor.

In the Claims

In Column 16, Line 26, in Claim 5, delete "cups" and insert -- clips --, therefor.

Signed and Sealed this
Twenty-eighth Day of December, 2021



Drew Hirshfeld
Performing the Functions and Duties of the
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office